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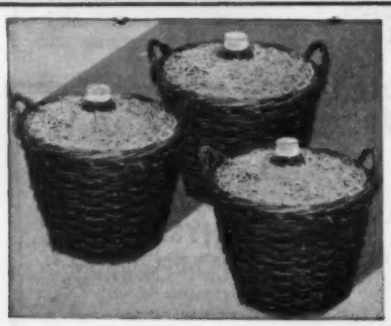

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DIAGNOSIS OF COMPLICATIONS AND ATYPICAL FORMS

BY F. G. NICHOLAS, M.B. Lond., D.M.R.E.
CONSULTING RADIOLOGIST TO ST. LUKE'S AND ST. STEPHEN'S HOSPITALS (L.C.C.) AND HARROW AND WOODSIDE HOSPITALS; AND

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(WITH ILLUSTRATIVE PLATE)

THE object of this investigation was to ascertain how far radiological examination may help in the diagnosis of pneumonia, and in this paper we want to direct attention to its value in the recognition of complications and atypical forms. Over a period of between two and three years more than 100 cases of lobar and broncho-pneumonia were radiographed at intervals; they were not selected, and as a rule were examined as soon as possible after admission to hospital. In addition a number of illustrative records have been included from other cases with which one of us (F. G. N.) has come in contact. The patients' ages ranged from nine weeks to sixty-nine years. About a third were children under ten years but above that age the numbers were fairly evenly distributed among the different ten-year age-groups. The distribution was equal in the two sexes.

Cases of pneumonia are rarely admitted on the first day of the disease, so that the date of onset often had to be estimated from the history. The interval between the onset and the first radiological examination varied considerably. About half the cases were radiographed within a fortnight of onset and 10 per cent. of these within a week. A further 25 per cent. were radiographed within four weeks and another 14 per cent. within seven weeks. In some patients, however, it was impossible to say when the disease began, for instance in those with a history of chronic cough and bronchitis, who might have been cases either of true pneumonia with delayed resolution or of primary atypical pneumonia.

Early in the investigation our interest was aroused in the rarer complications of pneumonia. Some of these tend to alter the whole course of the disease and may gravely affect the prognosis; others are of little significance and are chiefly of interest because of their radiological manifestations. Complications are more common in the later stages of the disease, and they affect, in order of frequency, the pleura, the lungs, and the mediastinum.

PLEURAL COMPLICATIONS

Dry pleurisy is common but of little clinical importance. The involvement of the pleura is transitory and slight and is likely to be masked by the shadowing due to the pneumonic process, and thus does not produce any recognisable radiographic signs. Serous effusions are somewhat rare and are usually small and absorbed spontaneously. Purulent effusions, however, may give rise to serious problems of diagnosis and treatment. It is convenient to divide them into parietal, diaphragmatic, interlobar, mediastinal, and encysted.

(1) *Parietal effusions* are the commonest and are usually unilateral. They lie between the layers of the pleura over the outer aspect of the lung, are often continuous with diaphragmatic effusions, and sometimes extend into the interlobar fissures. Large effusions cause little difficulty in diagnosis, but small ones, especially when near the base, may readily be missed radiographically. The clinical signs in such cases are usually the most reliable, and it is unsafe to exclude the presence of a small effusion on negative radiological findings.

(2) *Diaphragmatic effusions* are usually associated with basal pneumonia. They rarely occur alone, and are commonly an extension of a parietal or lower mediastinal effusion.

(3) *Interlobar effusions* may arise in any part of the interlobar fissures but are most common between the lobes of the right lung. They may be mistaken for consolidation, and for their accurate localisation a radiogram in the lateral position is essential.

(4) *Mediastinal effusions* are the rarest, though many were probably missed before radiography became the rule in acute diseases of the chest. According to Sagel and Rigler (1930) there are three types: (*a*) anterior or posterior (right or left); (*b*) bilateral; (*c*) saddle-shaped, in which there is an effusion in both the anterior and posterior spaces. A further subdivision is sometimes made into superior and inferior. The anterior bilateral variety is the least and the right posterior inferior the most common. Mediastinal effusions are usually fatal unless relieved by surgery or by spontaneous perforation into a main bronchus or the œsophagus. Radiographically they produce well-defined shadows with smooth outlines on one or both sides of the mediastinum. The following points will assist the differential diagnosis from the conditions with which they may most readily be confused. *Mediastinal tumours* are usually situated at the root and show rounded outlines. In *paravertebral abscess*, though there may be a fusiform shadow lateral to the spine, disease of the vertebræ should be evident. *Pericardial effusion* gives a shadow of even density and the outline of the heart is not seen. In *mediastinal effusion* the heart shadow should be readily visible. *Enlarged mediastinal glands* are usually bilateral and give a more globular outline than an effusion. *Collapsed lobes* may cause difficulty in diagnosis, but evidence of compensatory emphysema and bronchiectasis is usually present. *Intrathoracic goitre* may resemble an effusion in the superior mediastinum, but screen examination will establish that the shadow moves with deglutition (see Nicholas and Fraser 1937).

(5) *Encysted effusions* tend to be rounded or oval and arise in any part of the pleural sac, but most often in the parietal and interlobar sites. They are often sacculated, a point which must be kept in mind when their surgical treatment is undertaken. Clinically they may be difficult to diagnose, especially if they are situated deeply between the layers of the mediastinal or diaphragmatic pleura, but radiologically their detection is usually easy. Exploratory puncture may be necessary to confirm the diagnosis.

CASE 1.—A man of 46, who was quite well until two months before admission, when he caught a chill and probably had an attack of pneumonia. He had not been well since, and had complained of cough, phlegm, and loss of weight. There was dullness over the lower part of the right side of the chest, with gross râles and rhonchi over the upper third. Radiography revealed a large encysted effusion on the right side with another small encysted effusion just above it. Exploratory puncture showed the presence of pus, which contained *pneumococci*, Group I. The empyema was drained and the man's convalescence was uneventful.

LUNG COMPLICATIONS

These are less common than pleural complications and may arise in the earlier as well as in the later stages of pneumonia.

(1) *Lung abscess.*—(*a*) Solitary abscess usually follows breaking down of the lung in the lobar type of pneumonia, but may be secondary to perforation of an interlobar empyema into a bronchus. Radiologically the abscess shows as a large somewhat round dense shadow. After penetration into a bronchus it appears as a cavity with a fluid level. If the patient is too ill to be radiographed in the upright position, fluid levels can readily be demonstrated with the patient on his side and with the X ray tube in front of or behind him.

CASE 2.—A man of 57, admitted Oct. 20th, 1936, with lobar pneumonia. Physical signs were those of consolidation of right upper zone, and he had a cough with dyspnœa and slight cyanosis. Temperature on admission was 102° F.; it fell to normal on the seventh day but became irregular a few days later and continued so for several weeks, with increased expectoration. Sputum contained *pneumococci*, Group I. Dullness gradually diminished over the right upper zone but remained over the middle zone. Radiological reports as follows. Oct. 27th: Consolidation of right upper and middle zones. Nov. 19th: Rounded consolidation suggesting early lung abscess in right middle zone. Upper zone is clear (Fig. II *a* on Plate). Nov. 24th: Shadowing is less extensive, but an obvious cavity is now present (Fig. II *b*). Jan. 14th, 1937: Slight residual fibrosis in middle zone, with cavity almost obliterated.

(*b*) Multiple abscesses arise in the more severe forms of broncho-pneumonia, and several small cavities, showing fluid levels, may be seen.

CASE 3.—A man of 22, admitted May 11th, 1935. Three days previously he complained of pain on left side on breathing. Temperature on admission 102·5° F. Dullness over left base. Temperature fell to normal after seven days and he remained afebrile for three days; his temperature then became irregular and he began to cough up several ounces of foul sputum daily. Radiological reports were as follows. June 15th: Consolidation of left middle and lower zones, with two cavities with fluid levels at inner part of left middle zone (Fig. III). Sept. 25th: Lung clear except for slight residual fibrosis near the root.

Lung abscesses, both multiple and solitary, even when large, tend to heal spontaneously. This is well illustrated by the cases quoted above. The recuperative powers of the lung are so great, especially in children, that healing may take place in four to five weeks, and the paucity of residual signs in the lungs a few months after recovery is striking. Medical measures should therefore be given a thorough trial before surgical intervention is advised.

(2) *Acute gangrene of the lung* is very rare and usually fatal. At first it resembles the large solitary or multiple type of abscess, but instead of showing a tendency to heal the consolidation spreads and rapid breaking down and liquefaction of the lung follows.

(3) *Emphysema of the lung* has recently excited a great deal of interest. It is common in the later stages of lobar or broncho-pneumonia. In children it is more severe than in adults, but it usually passes off without ill effects. It may be divided into (*a*) compensatory, (*b*) vesicular or bullous, and (*c*) interstitial types.

(*a*) The so-called *compensatory type* occurs in lobar pneumonia. Whilst one lobe appears to be solid the remainder of the lung may show a generalised increase of transradiancy. The condition is only of academic interest as it disappears rapidly as resolution takes place.

CASE 4.—A boy of 16 months had had a cough with general malaise and fever for several days. Physical signs were those of a right basal pneumonia. Radiography (Fig. IV) showed consolidation of the right middle and lower zones with brilliant transradiancy of the right upper zone due to compensatory emphysema. Left lung showed normal transradiancy. The child later developed an empyema and died.

(*b*) The *vesicular or bullous type* is commoner in children than in adults, usually arising in the course of broncho-pneumonia, although it is also seen in the resolving and delayed stages of lobar pneumonia. It is due to gross over-distension of the alveoli with air, and presents a very striking appearance in a radiogram. The distended alveoli, which appear as round clear areas in the lung fields, sometimes attain a large size and simulate a partial pneumothorax, which indeed may also be present as a result of the rupture of an emphysematous bulla. The smaller bullæ often closely resemble cavities, and have been described as "pseudo-cavities." They may readily be distinguished from true cavities by the thinness of their walls, the absence of fluid levels, and the rapidity with which they disappear.

CASE 5.—A boy of 2 years, admitted May 11th, 1936, with cough, fever, and rapid breathing, and signs of left apical pneumonia. Radiological reports as follows. May 18th: Consolidation of left upper zone. June 12th: Opacity has almost cleared, but upper zone shows one large and several small rounded areas of increased transradiancy due to vesicular emphysema, resembling thin-walled cavities (Fig. V). Dec. 10th: Both lungs normal.

(*c*) The *interstitial type* is the least common; it is secondary to vesicular emphysema, and is apparently due to air escaping from distended alveoli along the pulmonary vessels into the mediastinum, and thence along the great vessels into the subcutaneous tissues of the neck and thorax. Radiographically it reveals itself as small transradiant areas in the mediastinal and subcutaneous tissues.

Spontaneous pneumothorax is sometimes seen in pneumonia and its method of production has caused much speculation. It has usually been attributed to the rupture of emphysematous bullæ on the surface of the lungs, but it may probably also be secondary to interstitial emphysema. Macklin (1937) has shown in cats that air can pass from artificially distended alveoli along the pulmonary vessels into the mediastinum, and from there through the mediastinal walls into the pleural sac.

CASE 6.—A boy of 2 years, admitted Jan. 1st, 1934, with cough, rapid breathing, and fever. Dullness over left upper zone and later over the right upper zone of lungs. He did not improve. On March 10th subcutaneous emphysema appeared in his face and increased until he could not open his eyes. It then extended down his neck to his thorax, so that he looked as if he had been pumped up with air. Radiogram on March 12th showed resolving pneumonia in the left lung, with a large emphysematous bulla occupying the apex, and spontaneous pneumothorax of the base with collapse of the lower lobe (Fig. VI). The right upper and middle zones showed consolidation, and the lower showed compensatory emphysema. Emphysema of the mediastinum and subcutaneous tissues of the neck was well marked. This case illustrates all the types of emphysema which may complicate pneumonia.

MEDIASTINAL COMPLICATIONS

(1) *Mediastinitis* gives rise to few radiological signs. There may be some increase in the width of the mediastinal shadow but the condition cannot be diagnosed radiologically with any certainty.

(2) *Mediastinal effusion* is readily confused with mediastinal pleural effusion. It causes an increase in width of the mediastinal shadow, and a lateral view will help to determine its site. Our series contained only one case, in which the effusion, together with a basal pneumonia, was secondary to a purulent pericarditis, and was situated anterior to the heart.

(3) *Mediastinal emphysema* when complicating pneumonia is secondary to interstitial emphysema, and has been described above. Care must be taken to differentiate it from air in a dilated œsophagus. In one case which we saw broncho-pneumonia was present in the bases of both lungs, and the air in the mediastinum was thought to be secondary to this until a barium swallow demonstrated the presence of cardiospasm in a grossly dilated œsophagus containing air-bubbles.

DELAYED RESOLUTION

In routine radiograms in pneumonia and other conditions we noticed the persistence of shadows in the lung long after those of a pneumonic process would be expected to have disappeared. Radiologically it is difficult to define delayed resolution satisfactorily because of the wide variation in the time of disappearance of the shadows. While in some cases the shadowing may have diminished greatly 14–20 days after the acute stages of the disease, in others it may remain for several weeks or even months. This variability is of little significance in itself, but it may be the cause of many problems in diagnosis. The usual problem is that of differentiating between delayed resolution and tuberculous infiltration, but lung neoplasm and various kinds of low-grade and atypical pneumonias may also cause confusion.

(1) *Delayed resolution without symptoms* is chiefly of radiological interest. This condition was seen in patients who clinically were quite well and were radiographed before leaving for convalescence; a follow-up of these showed that the shadowing usually cleared in a few weeks, though in some it remained for months. Persistence of the shadows is therefore of little or no significance in the absence of symptoms.

CASE 7.—A man of 42, admitted Sept. 18th, 1936, with signs of right basal pneumonia. For five days before admission he had complained of cough, pain in the side, and expectoration of blood-stained sputum. Two days after admission his temperature returned to normal and he was thereafter free from symptoms, but radiological examination showed incomplete resolution of the shadows five weeks later.

(2) In *delayed resolution with symptoms* the rate of disappearance of the shadows differs very little if at all from the above, but the patient usually complains of cough, malaise, and sometimes of blood-stained expectoration. The temperature is usually slightly raised and irregular. The shadowing may be massive and uniformly dense, occupying a whole or part of a lobe; more often it is mottled or streaky. When such cases have been under observation during the acute attack, or the history is clear-cut, there is little difficulty in diagnosis; but if the patient has not been seen before and the history is indefinite the diagnosis may be obscure. This is especially so when there has been hæmoptysis and the patient is referred with a tentative diagnosis of tuberculosis. Radiologically it may be impossible to differentiate between the two conditions without serial radiography. In tuberculosis the shadows will increase or remain stationary, whilst in delayed resolution they will show a gradual or rapid diminution.

CASE 8.—A woman of 19, admitted August 27th, 1935. She had felt run-down for two months, and three days before admission had complained of sore-throat and cough. Temperature on admission 100·6° F. Crepitations over right upper zone, regarded as due to tuberculosis. Sept. 17th, slight cough, scanty sputum. Sputum negative for tubercle bacilli on three occasions. Radiogram on August 31st (Fig. VIII) showed shadowing in right middle and left lower zones, suggesting tuberculous infiltration. On Sept. 19th radiogram showed both lungs quite clear. Though the history of pneumonia was indefinite the radiogram showed that there was a resolving pneumonia at the time of admission, which was indistinguishable from tuberculous infiltration until a later film was taken.

(3) *Chronic pneumonia* only differs from delayed resolution with symptoms in that the residual shadowing is more persistent and the symptoms are more severe and may last for several months instead of a few weeks. It includes the chronic forms of wandering pneumonia that are secondary to an acute attack. Elderly adults and children appear to be most prone to this type. In those beyond middle age, in addition to cough and slight pyrexia, there may be cachexia or hæmoptysis which may lead to a mistaken diagnosis of bronchial carcinoma. The diagnosis will be made on the history, signs, symptoms, and serial radiography, assisted if necessary by lipiodol injection and bronchoscopy.

CASE 9.—A woman of 59, admitted March 15th, 1935, with acute lobar pneumonia. Temperature was 102° F. on admission but fell to normal in six days. A few days later it rose to 102° F., and continued to fluctuate between 99° and 101° F. until the patient was discharged at her own request on April 12th. A radiogram on March 28th showed dense shadowing over right base. An attempt at lipiodol injection was unsuccessful. The patient's condition was very poor and she appeared to be going downhill. Clinically a diagnosis of lung neoplasm was made. The prognosis appeared to be grave at the time of her discharge. The cough and fever continued for several weeks after she left hospital, and she seemed to be getting worse. A month later she began to improve, and a radiogram on August 20th showed the right base almost clear.

CASE 10.—A man of 54, who had pneumonia at the right base in January, 1936 (Fig. IX *a*). The affected lobe was still opaque three months later, and a lipiodol injection was done in another hospital on suspicion of lung neoplasm. This showed no evidence of bronchial obstruction. He was readmitted on June 3rd, when a radiogram (Fig. IX *b*) showed incomplete resolution of the right base and also consolidation of the right upper lobe, suggesting neoplasm. On Jan. 28th, 1937, a radiogram (Fig. IX *c*) showed incomplete clearing over the right upper and lower lobes. The patient still complained of cough and malaise but his general condition was greatly improved.

In children persistent post-pneumonic shadows are sometimes seen as fairly large dense shadows near the lung roots, and may closely simulate so-called epituberculosis. Their nature can only be determined by serial radiography. Those due to post-pneumonic processes disappear more quickly and completely than those due to tuberculosis, which take 6–12 months or longer to resolve and usually leave signs of residual fibrosis or calcification. The Mantoux reaction, when negative, will differentiate between the two conditions, but the clinical signs are often very similar.

CASE 11.—A girl of 5 years, admitted Sept. 4th, 1936, with a history of bronchitis, pain in chest, languor, and fever for three days. Temperature was 103·6° F. on admission and became normal on the third day. Signs of consolidation of right upper lobe. Radiological examination on Sept. 14th

(Fig. VII) showed shadowing over right upper zone and around right root which was indistinguishable from epituberculosis. Examination on Nov. 12th showed that the shadows had disappeared.

CASE 12.—A girl of 7 years. Her mother had died of pulmonary tuberculosis in 1935 and one sister of tuberculous meningitis in the same year. Another sister had tuberculous glands. The patient had complained of pain in the left side of her chest on and off for two years, and had gradually lost weight. She had had a hard cough for six months. Mantoux reaction positive, 1/1000 O.T. No tubercle bacilli found in sputum or gastric washing. Temperature slightly raised and irregular. Radiological examination on May 30th, 1936, showed dense shadowing over left upper and lower parts of left middle zones. Serial radiography over a period of six months showed gradual diminution of the shadowing, but even 18 months after the first examination much residual shadowing remained, thus establishing the diagnosis of tuberculosis.

PRIMARY LOW-GRADE PNEUMONIAS

During this investigation we have been struck by the number of cases which neither clinically nor radiologically display the classical signs of acute pneumonia. These cases are very difficult to classify but in the main they may be divided into two large groups: the low-grade and the atypical pneumonias. The former, radiologically at any rate, may closely resemble acute pneumonia in its acute or resolving stages, or even some forms of lung neoplasm; while the latter are only likely to cause confusion in diagnosis because of their resemblance to tuberculous infiltration. Clinically, the low-grade pneumonias tend to be less severe and shorter than the atypical. The low-grade pneumonias more often occur in the very young or very old whilst the atypical show a predilection for young adults and those of middle age.

In its radiographic appearances primary low-grade pneumonia may be indistinguishable from acute pneumonia; but the term is used only when a recent attack of acute pneumonia can definitely be excluded. The prognosis is nearly always good, though the course of the disease may be long.

(1) *In the elderly* it occurs in two forms: lobar and broncho-pneumonic; the latter being the more usual. Radiologically these types cannot be differentiated from the acute pneumonias, but clinically the history and mildness of the symptoms makes differentiation easy. In both forms there is usually only a slight rise of temperature, with general indisposition and cough. Occasionally the sputum may be blood-stained.

(*a*) In the *lobar form* one lobe, usually the middle or lower on the right side, is uniformly dense. As a rule resolution of the shadow begins within a fortnight after the temperature has settled, but sometimes the condition persists and passes into a stage of chronic pneumonitis, when differentiation from primary lung neoplasm may be impossible without lipiodol injection and bronchoscopy. The temperature may reach 102°–103° F. in the first few days, but usually falls in a day or two and then is slightly raised or irregular for two or three weeks. The condition resembles lobar atelectasis, which indeed is often present, but the frequency with which residual fibrosis remains in the affected part of the lung leaves no doubt as to the presence of actual infection.

CASE 13.—A woman of 63, admitted April 5th, 1937, with a diagnosis of bronchitis following influenza. Temperature was 100° F. on admission and remained slightly raised for three weeks; it then settled. The patient was at no time acutely ill. Radiography showed a dense shadow projecting from the right root into the lower zone (Fig. X). The radiological evidence suggested lung neoplasm and expectoration of blood tended to confirm this. A lipiodol injection showed no sign of bronchial obstruction, and the shadow gradually disappeared. On June 4th the patient was quite free from symptoms and radiography at this time showed slight residual shadowing at the affected base.

(*b*) The *broncho-pneumonic form* clinically differs little from the lobar, but the temperature is inclined to be higher and more irregular and the physical signs less localised. Radiographically there is irregular shadowing in the lungs, chiefly at the bases, which occasionally simulates secondary deposits. Serial radiography readily establishes the diagnosis, for in broncho-pneumonia the shadows disappear in a few weeks.

CASE 14.—A man of 60, admitted Dec. 27th, 1935. He was poorly nourished and had complained of cough for two weeks prior to admission. The sputum, which was thick and profuse, contained no tubercle bacilli. There was no hæmoptysis. There were moist râles scattered throughout both lungs, especially at the bases. Temperature was 102° F. on admission and remained irregular and slightly raised for six weeks. Radiography showed rounded dense shadows at the base resembling secondary deposits (Fig. XI). When the patient was discharged on March 23rd, 1936, the lungs were clear.

(2) *In children* there appear to be two main types: one in which the shadows are somewhat massive and simulate epituberculosis, and another in which they are small and mottled, resembling tuberculous infiltration. The former is rare and is only differentiated from delayed resolution of acute pneumonia by the history, and from epituberculosis by the more rapid disappearance of the shadows. The second type has been described by Morton Gill (1937) as "simple pneumonitis." He maintains that the pneumonitis is not a non-resolution of pneumonia, because the symptoms are of recent onset, and also because both symptoms and signs disappear within a week or two. Similar radiographic findings may occasionally be seen in cases where there is a definite history of recent acute attack, and where both the signs and symptoms, as well as shadows, disappear within a few weeks. Moreover, the symptoms characteristic of simple pneumonitis—persistent cough, loss of weight and appetite, and occasional blood-stained expectoration—are not peculiar to this condition, and are often present in undoubted cases of delayed resolution. An example of this type is given below.

CASE 15.—A boy of 4 years, admitted July 6th, 1936, for a cough of seven days' duration. He had had epistaxis three days before admission and was feeling unwell. There were râles with impaired percussion note over the right base. Temperature on admission was 99·4° F. and was 102° F. for twelve days. Radiography (Fig. I) showed impaired transradiancy, with mottling over the right lower zone. The patient was discharged completely well on August 19th and a further radiographic examination a short time afterwards showed complete disappearance of the shadows.

ATYPICAL PNEUMONIAS

Although atypical pneumonias have much in common with the primary low-grade form, they often differ greatly in both their age-incidence and radiographic appearances. In general the atypical pneumonias show a predilection for previously healthy adults and their radiographic appearances closely resemble those of tuberculous infiltration. The symptoms are usually, though by no means always, mild, and the course of the disease tends to be prolonged.

(1) *Localised broncho-pneumonia* is a solitary focal pneumonia. Radiographically there are two kinds: one showing small shadows either single or multiple ½–1 inch in diameter, sometimes rounded and evenly dense; the other showing much larger shadows which have been described by Davidson (1935) as "fleeting shadows." These cases appear to be more prevalent during influenza epidemics, and are usually referred for investigation on account of a slight hæmoptysis which has aroused suspicion of tuberculosis. The symptoms are mild and usually there is only a slight rise of temperature with cough and malaise. The shadows tend to disappear in a comparatively short time and the patients soon get well. The smaller shadows often resemble Assmann's foci, while the larger ones may simulate lung tumours. The diagnosis is made clear by serial radiography, when the shadows will be found to disappear in a few weeks. Whilst there is little doubt that much of the shadowing is produced by a localised atelectasis, probably due to mucus plugging a small bronchus, the symptoms and the persistence of a small area of fibrosis at the site of the original lesion suggest that there is an underlying infection of the lung.

CASE 16.—A man of 51, admitted Oct. 8th, 1937, on account of cough, loss of weight, and general indisposition for a few weeks. No history of any recent acute illness. On the day of admission his temperature was slightly raised but was subsequently normal. No definite physical signs were found. Radiography (Fig. XII) showed a small round dense shadow in the right middle zone which gradually grew smaller. The patient was discharged well on Nov. 4th, when only slight residual shadowing was present.

(2) *Disseminated broncho-pneumonia or disseminated focal pneumonia.* The latter term is applied by Scadding (1937) to a type of pneumonia whose chief radiological feature is a coarse scattered mottling affecting large areas in one or both lungs, strongly resembling tuberculous infiltration. According to Scadding, its clinical features are "a relatively gradual onset with predominantly constitutional symptoms and a prolonged course; a gradual increase in the expectoration, scanty at first until about the third week, when profuse purulent sputum is being produced." As he points out, similar appearances have previously been attributed to broncho-pneumonia of a miliary type. Although many writers have considered it to be a type of influenzal pneumonia there is little doubt that the condition is seen quite apart from influenza epidemics.

CASE 17.—A nurse of 33 who reported sick on account of a cough and slight malaise for two or three days. Temperature was only slightly raised. There were râles and slight impairment of percussion note on both sides of the chest. Radiography showed coarse mottling scattered over both lungs, especially towards the bases. The patient, who was not at any time acutely ill, was sent for convalescence to the seaside and on her return three weeks later a radiogram showed that the lungs were perfectly clear.

CASE 18.—A woman of 39, admitted July 21st, 1936, was taken ill a few days before admission with cough and general malaise. On admission her temperature was 102° F.; it remained up for six days and then gradually returned to normal within fourteen days. There were râles with slight dullness over the right base. Radiography (Fig. XIII) showed scattered mottling resembling tuberculosis over the middle and lower zones of both lungs. The sputum was consistently negative for T.B. The patient was quite well when she left hospital on Sept. 30th. When radiographed shortly afterwards the lungs were found to be quite clear.

(3) *Successive transitory shadows with lung infiltration and eosinophilia.* Nils Hansson, who has described this condition recently (1937), states that "symptoms may be quite lacking and the temperature is usually normal or only slightly raised; the sedimentation rate is very slightly increased or normal. The most prominent objective sign beyond the X ray picture is a blood eosinophilia, which increases in parallel with the appearance and disappearance of the lung shadows." Loeffler, according to Hansson, considers the condition to be related to tuberculosis and erythema nodosum. The shadows often disappear from one part of the lung and appear in another. They do not remain in the same place for longer than a month, and in character resemble tuberculous infiltration. We have not, however, seen any cases which conform with Hansson's description and conclude that the condition is very rare.

SOME CLINICAL POINTS

This paper has of necessity been largely concerned with radiological findings but certain clinical details have impressed us in making our investigation.

Pyrexia.—Most of the patients were pyrexial at the time of the radiological examination but the degree of pyrexia did not appear to bear any relation to the extent of the shadows present. A high temperature may be associated with slight or extensive shadowing and considerable shadows may be present with little or no pyrexia. Indeed many patients when convalescent still showed shadows in the lung fields. The importance of this fact in diagnosis has already been emphasised.

Sputum, when present, was examined for organisms, but the type of organism present did not appear to be correlated to the radiological findings.

Hæmoptysis in a young adult suggests the probability of pulmonary tuberculosis, and in a middle-aged or elderly patient the possibility of neoplasm. If this hæmoptysis is associated with suggestive symptoms, physical signs, and radiological findings, the diagnosis is usually, and in most cases rightly, regarded as confirmed. We would emphasise that this assumption may sometimes be incorrect and such signs and findings may be due to unrecognised pneumonia. Of our cases five gave a history of frank hæmoptysis and in six the sputum was blood-stained (as distinct from "rusty"), so that in an appreciable percentage of cases hæmoptysis is the result of pneumonia alone.

Late sequelæ.—A radiographic follow-up of patients for two or three years showed that in the majority the lung fields eventually became quite clear. Where irreparable damage has been done to the lung tissue at the time of the acute attack and resolution has not been complete late sequelæ such as bronchiectasis may develop. Fibrosis follows abscess formation and healing. Thickening of the pleura is a common sequel of empyema but calcification is rare and only occurs as a late result.

SUMMARY

An account is given of the diagnostic features of the complications and atypical forms of pneumonia, based upon the routine clinical and radiological examination of over 100 unselected cases of pneumonia.

Delayed resolution, as shown radiologically by persistence of shadows, and primary low-grade and atypical pneumonias are not uncommon and may easily be mistaken for more serious conditions.

Routine radiography was found to be of great value in diagnosis.

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(*References at foot of next page*)

THE RHEUMATIC LUNG

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(WITH ILLUSTRATIONS ON PLATE)

"Rheumatic lung" is a non-committal title for a highly characteristic variety of massive pulmonary consolidation which occasionally complicates rheumatic carditis in its acute infective phase, developing at the time when fibrinous pericarditis and pleurisy with a mononuclear effusion are apt to complicate the clinical picture and when considerable numbers of cellular Aschoff nodes are found in the cardiac valves and myocardium. It is quite rare during the phase of congestive heart failure.

The consolidated lung presents a naked-eye and microscopic picture quite unlike that of any ordinary variety of pneumonia. Consolidation is always massive in fatal cases. While it may involve almost the whole of both lungs, it is commonly unilateral and in a minority is strictly confined to the right upper lobe. A sero-fibrinous effusion is commonly present but the pleuræ may be normal with extensive consolidation. Hydrothorax is very rarely seen. The consolidated lung is quite firm, remarkably elastic and resilient on palpation, resembling in consistency a block of india-rubber. Its contours are full: there appears to be no collapse. The cut surface, uniformly dark red to deep buff in colour, is non-granular, shows no mottling, looks smooth, wet, and succulent, and glistens like porcelain or a sheet of gelatin jelly. No air and very little fluid can be expressed from the consolidated parts and when scraped the knife carries away nothing more than clear blood-tinged fluid. The general impression gained from the macroscopic appearances is that the air in the lung has been replaced by a semi-solid non-flowing exudate. On the surface and in the substance of the lung there are always to be found small bright red apoplectiform hæmorrhages from 0·25 to 0·5 cm. in diameter. They vary considerably in number, are present in the non-consolidated parts of the lung, and tend to be clustered together at the bases. They may be few in number in the consolidated areas, quite large parts of which may be found free of them even on microscopic examination. The air-containing portions of the lung almost invariably show acute œdema and contain a large excess of watery blood-tinged fluid. The naked-eye Prussian-blue reaction for hæmosiderin is usually negative but with a long history of infection it may be positive. The amount of pigment rarely reaches that found in the brown induration of congestive heart failure. Active carditis is an invariable accompaniment of these changes. Fibrinous pericarditis with a relatively scanty effusion is common but occasionally, even with massive consolidation, there is no naked-eye evidence of pericardial inflammation. The cardiac chambers are always moderately dilated but the dilatation is not unduly right-sided. In about half the patients there is some degree of stenosis of the mitral valve but this is rarely extreme, and in those cases developing consolidation during the first attack of infection and dying within a few months of its onset there may be little or no stenosis. Recent platelet thrombi are always present as a single, double, or triple row of vegetations along the closure line of two or more valves.

(*Continued from previous page*)

DRS. NICHOLAS AND AGASSIZ: REFERENCES

Davidson, M. (1935) A Practical Manual of Diseases of the Chest, London, p. 512.
Gill, A. M. (1937) *Middlesex Hosp. J.* **37**, 20.
Hansson, N. (1937) *Acta radiol.* **18**, 207.
Macklin, C. M. (1937) *Brit. med. J.* **2**, 994.
Nicholas, F. G., and Fraser, T. A. (1937) *Practitioner*, **139**, 83.
Sagel, J., and Rigler, L. G. (1930) *Amer. J. Roentgenol.* **24**, 225.
Scadding, J. G. (1937) *Brit. med. J.* **2**, 956.

NATURE OF THE LESION

Not only is there no generally accepted explanation for these striking changes in the lung but a sharp division of opinion exists as to their essential nature and the following is a summary of current beliefs regarding their cause:

1. The lesion is mechanical in origin and the direct consequence of circulatory failure. The lung undergoes "splenization" as the result of œdema, congestion, and hypostasis and, to an uncertain degree, of collapse and atelectasis. Consolidation of the left lower zone has been ascribed to pressure of the large heart on the lung and to massive collapse from reflex immobilisation of the diaphragm consequent upon acute pericarditis (Coombs 1924).

2. The consolidation is inflammatory. (*a*) It has no specific characters. Its peculiar appearance is due to masking of the inflammatory reaction by acute œdema and hypostasis resulting from circulatory failure (Coburn 1933). (*b*) It is a specific inflammation. The signature of rheumatic infection—the Aschoff node—is present either in a typical or modified form and the small arteries and arterioles show the specific changes said to be peculiar to the visceral lesions of rheumatism (Eiman and Gouley 1928, Naish 1928, Fraser 1930, Eiman and Gouley 1932, Gouley 1938).

It is difficult to make out a case for the purely "mechanistic" theories. There is ample evidence in the shape of acute œdema and capillary rupture that such factors are in full operation throughout the whole of the non-consolidated parts of the lung, but such mechanisms as circulatory failure, diaphragmatic immobilisation, or pressure of the enlarged heart do not completely explain unilateral consolidation of part of the right lung, especially when this affects its upper lobe, or the lack of expressible œdema fluid in the consolidated areas.

Two criticisms can be made of the published histological accounts of the rheumatic lung. In the first place there is no clear description of the sequence of changes in the lung nor any attempt to correlate histological changes with the probable or approximate duration of the disease as determined from clinical data. Secondly, a considerable amount of patient high-power histological research has been concerned with discovering lesions which resemble the Aschoff node as it is seen in other tissues or in finding changes in the pulmonary vessels of a specific kind such as those described by Pappenheimer and Glahn (1924). The latter changes can be found in lungs in which rheumatic consolidation is absent and the Aschoff node as a clear-cut lesion is difficult to identify in a loosely knit tissue like the lung which, in the intermediate stages of rheumatic consolidation, is diffusely infiltrated by large mononuclear cells.

In May of last year Masson, Riopelle, and Martin published an account of the histological examination of the lungs of thirteen children with rheumatic consolidation. They described a series of changes which throw light on the actual mechanism of consolidation and help one to visualise the sequence of histological events. Similar changes have been found in the lungs of five patients recently in this hospital, and the object of this paper is to put on record a confirmation of the work carried out in Montreal.

The clinical features in the two series of cases are almost identical. The average age at death was 8·6 years. In 70 per cent. of the patients death takes place during an acute exacerbation of a relapsing infection, the total average duration of which is 1 year. In 30 per cent. the pulmonary consolidation complicates a first attack of virulent infection, the average duration of which is 7 weeks. In one of Masson's patients death took place on the eleventh day of the initial attack; in another, in this hospital, on the thirtieth day of the first attack after a period of relapsing acute dyspnœa of 17 days. The final stage of acute dyspnœa, which may be continuous or relapsing, varies from 3 to 30 days.

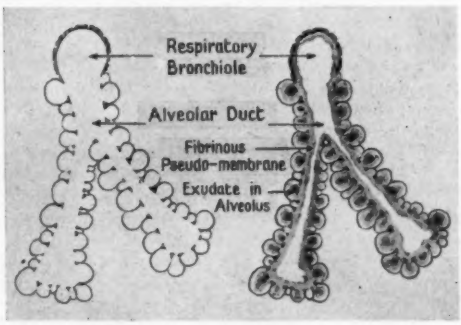
HISTOLOGICAL CHANGES

The histological changes in the lungs are strictly confined to the region of gaseous exchange, the air-conducting system showing little or no evidence of disease. In the early stages of consolidation every alveolus over large areas of the section is seen to contain a loose coagulum of fresh fibrin which in the earliest cases contains remarkably few cells (Figs. 1 and 2 on Plate). There is moderate capillary hyperæmia of the alveolar walls but the extreme capillary engorgement and varicosity of passive venous congestion is absent and the degree of hyperæmia is considerably less than that of lobar pneumonia. Throughout the section there are many widely open spaces which correspond in size and shape to dilated alveolar ducts (Fig. 1), and a closer examination of these reveals the fact that almost all of them are lined by a false membrane of hyaline eosinophil material, which looks like fibrin and is closely applied in a continuous sheet against the openings of the alveoli arising from the dilated duct (Fig. 3 on Plate). The alveolar ducts are thus abnormally prominent, partly because they are dilated but chiefly because they are thrown into strong relief against a background of consolidated alveoli and are abnormally clearly outlined by the hyaline membrane closely applied to their walls (Fig. 5). Some of the alveolar ducts are empty, but the majority contain exudate which appears to be albuminous. The hyaline membranes in the alveolar ducts in the early stages are so numerous and their continuity is so well preserved that they must seal off a very large number of tributary alveoli and seriously interfere with gaseous exchange.

The above picture is not often seen in its pure form for, apparently in the course of a few days, there is a widespread infiltration by mononuclear cells and the fibrin in the alveoli rapidly becomes fragmented and loses its form. The hyaline membrane in the alveolar duct persists but becomes irregular and fragmented. The alveoli slowly become packed with mononuclear cells and it is difficult to escape the conviction that these cells constitute a mesenchymal phagocytic reaction to the presence in the lung of a fibrinous exudate. In about 14 days as judged from clinical data it is difficult to find clear evidence of the initial lesion. The lung is literally over-run by large mononuclear cells and the exudate in the alveolar ducts is now undergoing fibroblastic replacement (Fig. 4 on Plate). In 3 weeks many of these ducts contain cylinders of fibroblasts lying in a matrix rich in fibroglia, and it seems quite clear that what has been regarded as interstitial fibrosis is nothing more than the fibroblastic organisation of an exudate poured out into the finest air-ways of the lung at the onset of the consolidation, and it appears very probable that the mononuclear infiltration is nothing more than a mesenchymal reaction to an equally widespread fibrinous exudate poured out into the alveoli.

The mode of formation of the hyaline membranes in the alveolar ducts is an interesting problem. The process has been described in a strange variety of conditions. During the influenza pandemic of 1918 it was so commonly found in the lungs of patients dying of "acute fulminating pneumonia" that it came to be regarded as peculiar to influenzal infection and was called the "virus lesion" (MacCallum 1918, 1919, Goodpasture 1919, Opie 1928, and Wolbach 1919). Since then it has been found in the lungs of patients dying of pneumonic plague (Johnson 1923), acute streptococcal pneumonia in infants and adults, and acute tuberculous pneumonia (Ferber and Wilson 1932). Ferber and Sweet (1931) found a similar change in the lungs of new-born infants asphyxiated from aspiration of amniotic sac contents. These membranes were rich in fat and contained keratinising

FIG. 5



surface epithelium, suggesting that vernix caseosa had been aspirated with amniotic fluid during violent dyspnœa into the finest ramifications of the air-ways. The lungs of fatal cases of mustard-gas poisoning show hyaline false membrane production similar to that of the pneumonias (Kuczinski and Wolff 1921). Finally, Ferber and Wilson have observed a similar process in the lungs of children dying from pharyngeal and respiratory paralysis complicating acute anterior poliomyelitis after vigorous efforts at artificial respiration had been carried out in a Drinker apparatus. Forcible inspiration was thus induced when, presumably, the lungs were already extensively waterlogged. Two factors are in operation in all these conditions including rheumatic consolidation. Severe inspiratory dyspnœa is common to them all and this is invariably associated with a gross excess of albuminous fluid in the finest air-ways. It was first suggested by Wolbach, and appears to have been confirmed by Ferber, that under these conditions air under tension becomes imprisoned in the alveolar ducts behind fluid exudate and the fluid around the imprisoned air is forced as a thick film or "membrane" against the walls of the ducts. Ferber has produced similar membranes experimentally by the intratracheal injection of sero-fibrinous exudate into the lungs of dyspnœic rabbits. He was also able to show that a foreign viscous fluid in the air-ways may be forced as a film against the walls of the alveolar ducts during severe dyspnœa. He immersed rats in indian ink for one to two minutes, and removed them for a few minutes during which time they were acutely dyspnœic. The alveolar ducts over large areas of the lungs were clearly outlined by black films of indian ink.

It should be clearly understood that this paper deals only with fatal cases in which rheumatic consolidation of the lung had coexisted with severe

active carditis. Consolidation may however be detected in other cases which ultimately make a good recovery. The outstanding clinical feature of such cases is the absence of dyspnœa of severe degree in spite of the presence of signs of massive consolidation (Naish 1928). The existence of these cases, well attested by clinical experience, affords a reasonable explanation of the sequence of events in fatal cases. It may be assumed that this consolidation in fatal and non-fatal cases is the result of widespread fibrinous alveolitis. With mild or moderate carditis, unaccompanied by cardiac dyspnœa, this process frequently resolves. When carditis is severe, dyspnœa becomes urgent, the alveolar ducts over large areas of lung become lined by hyaline membrane, innumerable tributary alveoli are occluded, and there is serious interference with gaseous exchange. The cause of the initial fibrinous alveolitis thus becomes the central problem in the elucidation of the nature of rheumatic consolidation.

CONCLUSIONS

1. The primary lesion responsible for the consolidation of the "rheumatic lung" is widespread fibrinous alveolitis. This is followed by a cellular infiltration, mononuclear in type, relatively slow in development but eventually becoming copious and diffuse.

2. In fatal cases this primary lesion is complicated by hyaline pseudo-membrane formation in most of the alveolar ducts in the consolidated lung.

3. As in other varieties of pneumonitis this process takes place in lungs in which the finest ramifications of the air-way contain viscid albuminous exudate and after a period of severe inspiratory dyspnœa.

4. The dyspnœa which initiates membrane production in the rheumatic lung is probably primarily cardiac in origin.

REFERENCES

Coburn, A. F. (1933) *Amer. J. Dis. Child.* **45**, 933.
Coombs, C. F. (1924) Rheumatic Heart Disease, Bristol.
Elman, J., and Gouley, B. A. (1928) *Arch. Path.* **5**, 558.
— — (1932) *Amer. J. med. Sci.* **183**, 359.
Ferber, S., and Sweet, L. K. (1931) *Amer. J. Dis. Child.* **42**, 1372.
— and Wilson, J. L. (1932) *Arch. Path.* **14**, 437, 450.
Fraser, A. D. (1930) *Lancet*, **1**, 70.
Glahn, W. C. von, and Pappenheimer, A. M. (1924) *J. med. Res.* **44**, 489.
Goodpasture, E. W. (1919) *Amer. J. med. Sci.* **158**, 863.
Gouley, B. A. (1938) *Ibid*, **196**, 1.
Johnson, W. C. (1923) *Proc. N.Y. path. Soc.* **23**, 138.
Kuczinski, M. H., and Wolff, E. K. (1921) *Ergebn. allg. Path. path. Anat.* **19**, 947.
MacCallum, W. G. (1918) *J. Amer. med. Ass.* **71**, 704.
— (1919) *Ibid*, **72**, 720.
Masson, P., Riopelle, J. L., and Martin, P. (1937) *Ann. Anat. path. méd.-chir.* **14**, 359.
Naish, A. E. (1928) *Lancet*, **2**, 10.
Opie, E. L. (1923) *Arch. Path.* **5**, 285.
Wolbach, S. B. (1919) *Bull. Johns Hopk. Hosp.* **30**, 104.

ORGANIC GASTRIC SYPHILIS

REVIEW AND CASE REPORT

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(WITH ILLUSTRATIONS ON PLATE)

Organic gastric syphilis, as a clinical entity, has had little attention in this country, and while scepticism about cases reported before the introduction of the Wassermann reaction is no doubt wise, it is hard to understand the general reluctance to accept those that have been proved beyond all reasonable doubt. Certainly syphilis of the stomach is relatively rare, and in syphilitic patients both ulcers and neoplasms are much more common than gummata; the patient with a gastric lesion and evidence of syphilis elsewhere is not necessarily suffering from gastric syphilis. Most American writers have insisted on microscopic confirmation of the diagnosis, either at autopsy or after operation, but the object of this article is to emphasise the possibility of making a diagnosis and obtaining clinical cure without recourse to laparotomy.

Gastric syphilis was probably recognised by Andral in 1834, but over a century later its diagnostic features are not universally accepted. It is interesting to study the cyclical manner in which the diagnostic criteria have changed and to note that the therapeutic test is once again the most important part of the diagnosis. In the earliest cases the diagnosis was largely based on clinical findings and the response to mercury; in 1891 Chiari published reports of two cases found at autopsy and the pathological picture has since been often described; in 1922 McNee's discovery of spirochætes in a gummatous area of the stomach seemed finally to place the diagnosis on a firm pathological basis; but to-day the circle is complete and the diagnosis now rests again on the satisfactory response to a sound therapeutic test.

INCIDENCE

Osler (1912) and Allbutt (1921) agree that the condition is excessively rare.

According to O'Leary (1930) it was found in less than 0·3 per cent. of syphilitic patients in the Mayo Clinic; Symmers (1916) found 314 syphilitic patients in 4880 autopsies at Bellevue Hospital, New York,

LEGENDS TO FIGURES ON ILLUSTRATIVE PLATE

PROF. HADFIELD

1—Early stage, low magnification. Uniform consolidation, due to fibrinous alveolitis. Branching alveolar ducts prominent throughout section because of dilatation and hyaline membrane formation in their walls.

2—Early lesion. Diffuse fibrinous alveolitis. Scanty cellular reaction almost exclusively monocytic.

3—Stage of early mononuclear infiltration. A branching alveolar duct in the centre of the field is lined throughout by a thick pseudo-membrane. It is now difficult to see the fibrinous alveolitis clearly and mononuclear infiltration is more marked.

4—Stage of mononuclear infiltration. The exudate in the alveoli and alveolar ducts is replaced by a copious mononuclear infiltration.

DR. LAIRD

Upper half—Stomach before treatment showing defect in middle third. (A) Immediately after food. (B) Three hours after food. Both standing.

Lower half—Stomach after treatment showing normal appearance. (A) Immediately after food. (B) Three hours after food. Both standing.

DR. ANGLIN

1—Radiogram showing miliary shadows throughout the lung.

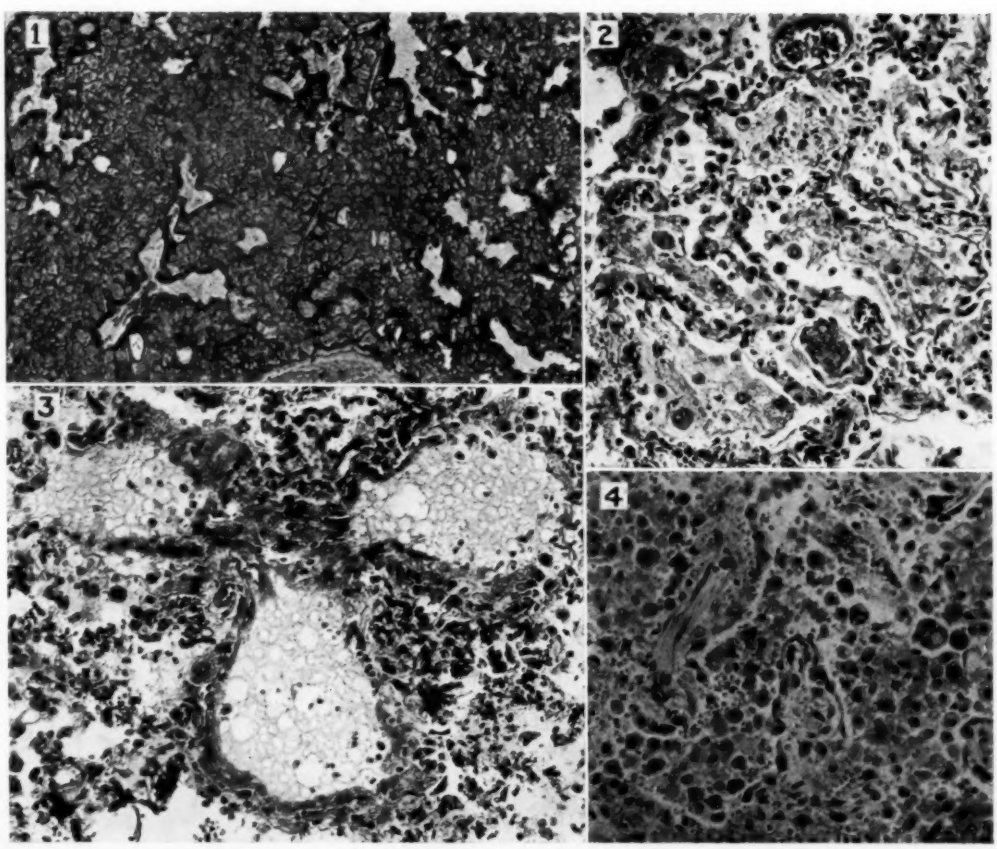
DR. ANGLIN : MITRAL STENOSIS

Fig. 1

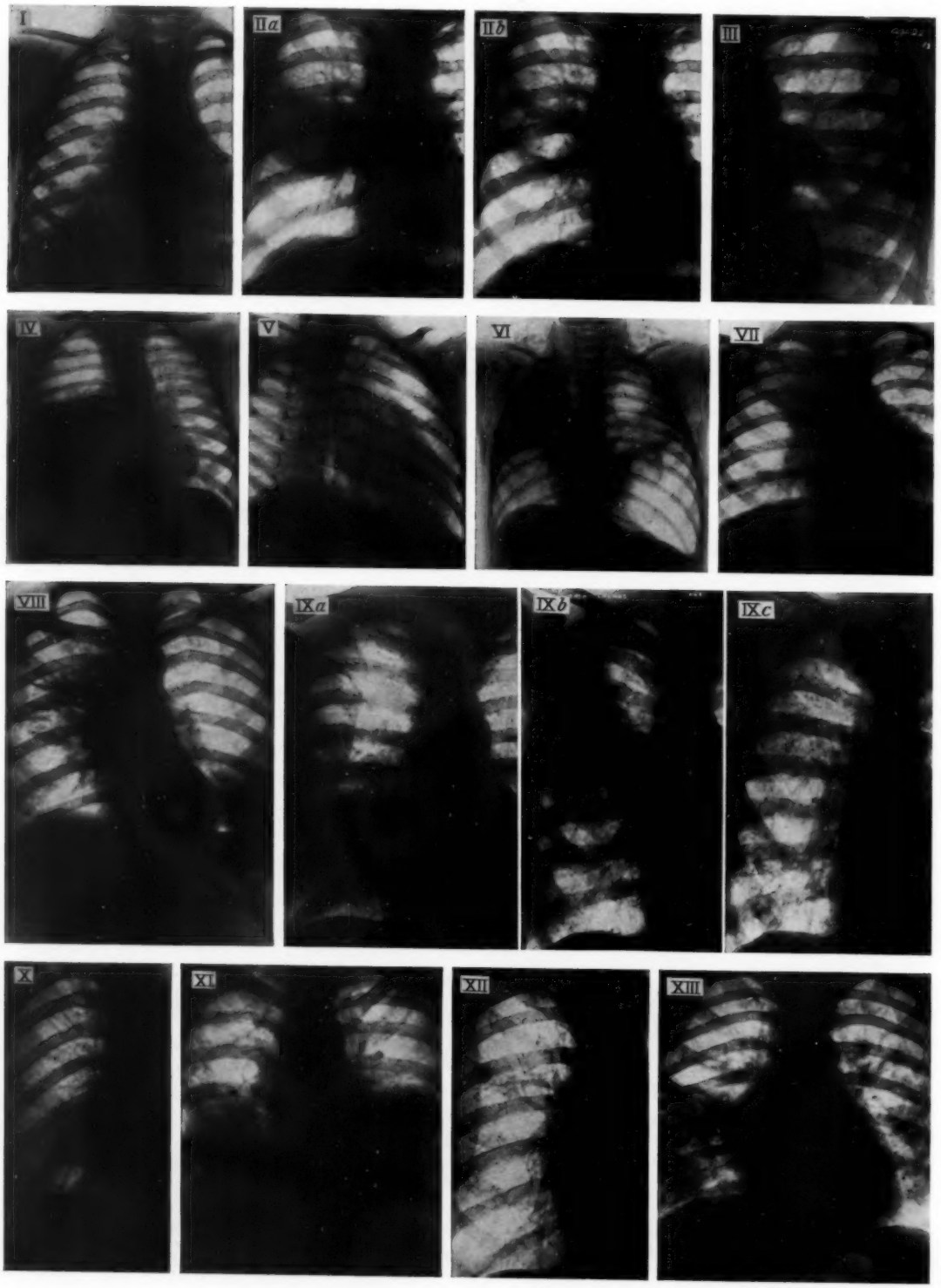
DR. LAIRD : ORGANIC GASTRIC SYPHILIS

A B

PROF. HADFIELD : THE RHEUMATIC LUNG



DRS. NICHOLAS AND AGASSIZ: RADIOGRAPHY IN PNEUMONIA



but among these only 1 case of gastric syphilis was noted; Chiari (1891) found stomach lesions in 2 out of 243 autopsies on known cases of syphilis; Gmelin (1925) stated that E. Fraenkel saw only 4 cases during more than forty years as pathologist in one of Germany's largest hospitals and that in the last 10,000 autopsies at the same hospital not one case was seen; Merril (1928) found only 10 cases in his review of 18,000 gastric examinations at Massachusetts General Hospital; and Fitts (1930), from studies of negroes in the southern States, three-quarters of whom he estimated had syphilis, reported no syphilitic lesions of the stomach in 500 autopsies; and Turnbull (1922) in 3000 autopsies at the London Hospital found only one doubtful case. Finally, reports from Russia (Hausmann 1911 and 1924 and Luria 1929) and China (Galloway 1922) suggest that gastric syphilis is more commonly recognised in these countries than in Europe and America.

That the incidence at autopsy under-estimates the real incidence is suggested by Singer and Meyer (1929), who found 4 cases of gastric syphilis at operation during a long period in which no gastric syphilis was found in 5000 autopsies, although 10 per cent. of these showed other evidence of syphilis. They consider that in this the condition is analogous to duodenal ulcer which Moynihan and Mayo showed to be a common lesion at operation but comparatively rare at autopsy, and they conclude that gastric syphilis tends to heal and in so doing loses its characteristic anatomical features.

That syphilis of the stomach does heal is demonstrated in Cabot Case No. 21,182 (1935). As the condition may arise in both congenital and acquired syphilis the actual age-incidence varies widely. Thus in 93 cases reported by Eusterman (1931) the limits were twenty-nine and forty-eight years and the sex-incidence was 65 males and 28 females.

PATHOLOGY

Syphilis may present various lesions on macroscopic examination of the stomach and O'Leary (1931) has tabulated the following recorded types: (1) multiple gummatous ulcers; (2) single gummatous ulcer; (3) diffuse gummatous ulceration; (4) nodular ulcerative lesions; (5) chronic interstitial fibrosis; (6) nodule; and (7) linitis plastica.

The disease begins as a gumma of the submucosa and extends from there into the other coats; submucous gumma is therefore the commonest type of lesion encountered. Through the breaking down of the gummata, particularly because of the action of the gastric juice, ulcers and ultimately scars may form. The ulcer tends to be quite large, with an irregular serpiginous border and a firm smooth base and thickening of the wall of the stomach is demonstrable at a considerable distance from the ulcer itself. The lesions may be situated in any part of the stomach but seem to be most frequent in the pars pylorica, involving either the lesser or greater curvature or both. They show perivascular round-cell infiltration and endarteritis obliterans.

Fenwick (1901) thought that syphilis affected the stomach by the formation of gummata and the production of endarteritis, and by exciting chronic inflammation of the mucous membrane. Endarteritis and inflammation would explain why hæmatemesis is rare and achlorhydria common.

Most writers demand pathological proof, from laparotomy or autopsy or both, before accepting the diagnosis of gastric syphilis, even where the clinical diagnosis appears sound and the case has responded satisfactorily to a stringent therapeutic test. The clinician on the other hand is entitled to demand that the pathological evidence should be unequivocal before subjecting his patient to laparotomy, which may be fatal to a debilitated patient. Often such evidence is not forthcoming. Autolytic degeneration after death is very rapid, and even in specimens obtained fresh at laparotomy the differentiation between chronic benign ulceration and syphilitic lesions must be inconclusive, unless the information given by the history, by gastric analysis, and by serum tests is taken into account. Must we then, before beginning antisyphilitic treatment, make the patient undergo laparotomy—just to provide material on which an unbiased pathologist can seldom make a definite report except in the light of data that were available without operation? I admit of course that when the diagnosis lies between gumma and carcinoma in an operable stage the delay entailed by a therapeutic test may not be justified.

The above contention that pathological examination can seldom definitely establish or refute a clinical diagnosis of gastric syphilis is supported by Turnbull (1922) and by Harris and Morgan (1932), who state that perivascular round-cell infiltration and obliterative endarteritis although constant in syphilitic lesions are by no means pathognomonic. Downes and LeWald (1915) remark that "the pathologic diagnosis of syphilis of the stomach is even more difficult to establish with certainty than the clinical

LEGENDS TO FIGURES ON ILLUSTRATIVE PLATE

DRS. NICHOLAS AND AGASSIZ

I—Primary low-grade pneumonia (simple pneumonitis) of right base in a child.

II *a*—Rounded consolidation of the right middle zone due to early lung abscess.

II *b*—Five days later; an abscess cavity is now readily apparent in the right middle zone.

III—Multiple abscesses in left lung showing fluid levels.

IV—Compensatory emphysema of upper part of right lung and pneumonic consolidation of lower part.

V—Vesicular emphysema of upper part of left lung.

VI—Interstitial emphysema with air in mediastinal and subcutaneous tissues. The other forms of emphysema as well as spontaneous pneumothorax are also present.

VII—Incompletely resolved pneumonia in a child, resembling "epituberculous pneumonia."

VIII—Incompletely resolved pneumonia of both lungs in a case that clinically simulated tuberculosis.

IX *a*—Chronic pneumonia (chronic pneumonitis) simulating lung neoplasm.

IX *b*—Six months later. Right base nearly clear, but upper zone shows consolidation.

IX *c*—Another six months later. Right lung still shows shadowing due to incomplete resolution. Traces of lipiodol at right base.

X—Primary low-grade pneumonia. Shadow projecting from right root into lower zone, resembling neoplasm.

XI—Primary low-grade pneumonia at bases, resembling large secondary deposits of neoplasm.

XII—Localised broncho-pneumonia in right middle zone.

XIII—Atypical pneumonia of both lungs (disseminated focal type).

diagnosis, as syphilitic infiltration so closely resembles tuberculosis"; and Eusterman (1931) concludes that "in the light of accumulating knowledge, the attitude that a case of gastric syphilis is not proved without histologic or bacteriologic confirmation, or both, is unjustifiable and, in my opinion, is detrimental to scientific progress."

The demonstration of spirochætes by McNee in 1922, in Levaditi-stained sections from certain parts of a gummatous stomach identified at autopsy, appeared to be the long-sought pathological link in the diagnostic chain of gastric syphilis. Warthin also claimed, in a personal communication to O'Leary (1931), to have found spirochætes in the gastric lesions of 8 syphilitic patients. That these spirochætes, as isolated by McNee at least, were not necessarily *Spirochæta pallida* was suggested by Singer and Dyas (1928) and this led Harris and Morgan (1932) to inoculate the testicles of rabbits with an emulsion of gastric tissue and an emulsion of a neighbouring gland from a syphilitic with pyloric stenosis in whom spirochætes were found in the resected specimen. All the rabbits inoculated are claimed to have developed typical lesions of syphilis from which typical *S. pallida* were recovered. Singer (1933) believes that the spirochætes found by McNee were secondary invaders from the mouth and states that oral spirochætes have been demonstrated in gastric carcinomatous ulceration and also in peptic ulcer. A parallel exists in the finding by Pilot and Davies (1924) of oral spirochætes in abscesses and gangrene of the lung. It must be remembered, however, that the Levaditi stain often renders the various spirochætes indistinguishable from one another. Singer suggests, in addition, that rabbit inoculation may be fallacious because of the existence of spirochætosis in the rabbits. This condition is a spontaneous venereal disease caused by *S. cuniculi*, which according to Noguchi (1928) is practically indistinguishable from the *S. pallida*.

It seems that the clinician must diagnose gastric syphilis on evidence less controversial than that of the pathological findings and it appears unreasonable to insist, as do Chiari (1891), Pater (1907), Boas (1925), Albu (1921), McNeil (1915), and Hartwell (1925), that one must obtain material for pathological study before making a diagnosis and starting treatment.

SYMPTOMS AND SIGNS

The symptoms and signs may closely simulate those of gastric carcinoma. They include abdominal pain, nausea, vomiting, anorexia, anæmia, loss of strength and weight, and cachexia. The pain is centred in the upper abdomen and, except in the very early stages, is constant, varying in the same case from epigastric discomfort to severe cramp-like seizures. The latter tend to come on some hours after food and may be relieved by emesis although the underlying discomfort is never abated. The pain never shows the remissions so common in peptic ulcer, and is never relieved by diet or alkalis.

Nausea is a prominent symptom and vomiting occurs, especially in late cases, with gastric retention. Hæmatemesis and melæna are less common than in gastric carcinoma or peptic ulcer (Eusterman 1917 and 1931, Downes and LeWald 1915, Fenwick 1901, Smith 1930, Morton 1932, O'Leary 1931), but have been reported by McNee (1922), Mackay (1898), Graham (1922), and Rehfuss (1927). Anorexia, anæmia, loss of weight and strength, and cachexia are seldom as severe as in gastric carcinoma. Sometimes the appetite remains satisfactory (Eusterman 1917) and sometimes there is flatulence. The actual combination of symptoms depends on the type of gastric lesion and, in particular, on the presence or absence of stenosis and obstruction and therefore on the stage of the disease at which a diagnosis is made. The duration of symptoms in the reported cases varies from six months to three years, with an average of about two years.

A palpable epigastric mass, which may be tender, has been described by McNee (1922), Morton (1932), Einhorn (1902), Hausmann (1924), Pezoldt (1915), and Sherren (1921), and was noted in 20 per cent. of the 93 cases described by Eusterman (1931). Smith (1930) emphasises the absence of secondary deposits as an important differential point in cases simulating carcinoma. The clinical examination may reveal syphilis of other structures.

Apparently then there is no single diagnostic feature of gastric syphilis and the clinical picture closely simulates that of gastric carcinoma. This has been well summarised by Herman (1927), who wrote: "the stomach has a cancer but not the patient."

INVESTIGATIONS

In the absence of diagnostic signs or symptoms a positive Wassermann reaction is a fundamental requirement before gastric syphilis can reasonably be suspected in a patient who presents evidence of organic disease of the stomach. The blood Wassermann reaction is positive in a high proportion of genuine cases, but, especially in cases where it is negative, the importance of investigating the cerebro-spinal fluid must be remembered (Stokes and Brown 1922). As gastric syphilis may arise many years after the initial specific infection, the possibility of a syphilitic ætiology can only be eliminated after a careful examination has excluded other evidence of syphilis. Singer and Eusterman agreed (LeWald 1931) that a positive Wassermann reaction, although desirable, is not absolutely necessary for diagnosis, and of O'Leary's 93 patients 6 had a negative Wassermann reaction.

Gastric analysis in syphilis of the stomach almost always shows achlorhydria or marked hypochlorhydria except where retention of gastric contents complicates the test (Fenwick 1901, Morton 1932, McNee 1922, Smith 1930, Glaser 1921, Hausmann 1924, Brugsch and Schneider 1915, Eusterman 1931, Neugebauer 1917, Grun 1932, Priestly and Walters 1934, McNeil 1915, Downes and LeWald 1915, and Herman 1927). Rapid emptying of the stomach contents is often associated with the achlorhydria (LeWald 1931, and Smith 1930). The almost constant achlorhydria is probably due to chronic gastritis (Brugsch and Schneider 1915) and to rapid emptying of the gastric contents when this is present (LeWald 1931). In a few cases with achlorhydria or hypochlorhydria free acid may reappear or increase later under anti-syphilitic treatment (Hurst 1922 and Eusterman 1931).

There are no definitely diagnostic radiological appearances in gastric syphilis, for they depend on the nature and site of the lesion and may include stenosis, an ulcer, a filling defect, or an infiltration. LeWald (1931), Carman (1918), Moore and Aurelius (1928), Yeo (1931) and Eckhoff (1931) have postulated the radiological criteria which they believe to be suggestive, the features most generally agreed upon being diminished capacity of the stomach, rapid emptying, and a symmetrical, diffuse lesion in cases where obstruction has not yet developed. The radiological, in the same way as the clinical, picture may simulate that of carcinoma. That radiological improve-

ment may take place and be maintained under anti-syphilitic treatment has been shown by O'Leary (1931), LeWald (1931), and Eusterman (1917). Paradoxically the X ray picture may deteriorate, since treatment, by causing fibrosis of the lesion, may lead to the development of stenosis.

A record of the patient's weight at frequent and regular intervals is of value in diagnosis and in the appraisal of progress. In gastric syphilis loss in weight is prominent, and under successful treatment the return to normal weight is equally striking. There is commonly a hypochromic anæmia which is improved by anti-specific treatment, although iron and hydrochloric acid help to achieve this result more quickly.

Finally, gastroscopy, with increasing use, should prove of great value.

DIAGNOSIS

Gastric syphilis does not favour dramatic diagnosis. The condition can be suspected only after careful consideration of all the evidence, including a detailed history and a full clinical, laboratory, radiological, and serological investigation. The pleomorphism of the disease must be remembered in evaluating the available data, and typical unequivocal findings must not be expected in every case. Carcinoma of the stomach is the disease most likely to be confused with gastric syphilis and in every atypical case of carcinoma the possibility should be seriously considered and excluded only after the fullest examination.

The diagnostic criteria which, when found in combination, are strongly suggestive of gastric syphilis have been laid down by Eusterman (1931), Smith (1930), Hartwell (1925) and others, and include the following:—

(1) There must be symptoms of disease of the stomach.
(2) There must be serological or other clinical evidence of syphilis.
(3) There must be radiological changes compatible with those known to be associated with gastric syphilis, and there should be characteristic changes on gastric analysis.
(4) An ulcer régime should lead to no definite improvement in the symptoms.
(5) There must be a sustained response to a stringent therapeutic test.
(6) There should be radiological confirmation of the healing of the gastric lesion resulting from antisyphilitic treatment.

I have already suggested that the diagnosis is essentially clinical, dependent on the combination of several findings and of these the therapeutic test is individually of outstanding value. O'Leary (1931) has clearly enunciated the principles of this test:—

It is preferably carried out with the patient under observation in hospital, where the diet can be accurately controlled. A general mixed diet is given and if the gastric capacity is diminished the daily ration is divided into four or six meals, instead of the customary three. The patient should be ambulant if the general condition permits. A frequent record of the weight is made at regular intervals under strictly comparable conditions, and the degree of anæmia is also estimated. All medication, other than antisyphilitic measures, is discontinued throughout the test. In a positive case there is rapid and persistent relief of the gastric symptoms, gain in weight and strength, decrease in the anæmia, and an increasing subjective feeling of well-being. There may be a change in the radiological picture in about half of the cases and very occasionally an approach to normality on gastric analysis. The improvement must be maintained for at least two years.

A fuller appreciation and observance of all the factors in the therapeutic test would increase the accuracy of the diagnosis and diminish the frequency of unnecessary gastric operations. A survey of the literature reveals that the instructions are more often honoured in the breach than in the observance, the commonest shortcomings being the giving of an ulcer diet, insufficient duration of the follow-up, and the impatience which has led to many cases being subjected to partial gastrectomy after only a fortnight of antisyphilitic treatment. These latter criticisms, in varying degree, appear to apply to the cases published by Niles (1916), Smithies (1915), McNeil (1915), Singer and Meyer (1933), Carns (1936), and Morgan (1915).

In my opinion a satisfactory therapeutic test should be applied to every patient in whom gastric syphilis is suspected. As I have said already, however, an important exception to this rule is the case where the diagnosis lies between gastric syphilis and early gastric carcinoma. Here laparotomy must be performed as soon as the pre-operative preparation, which may include blood or other transfusion and one or two intravenous injections of a "914" compound, is completed.

TREATMENT

In treatment each case must be studied individually and such factors as age, general condition, associated lesions, and the extent of the gastric lesion must be considered. The conditions imposed by the therapeutic test, once the decision to use it has been made, must be faithfully observed and treatment confined to antisyphilitic measures except for attention to general hygiene and nursing. Accordingly an ordinary diet is prescribed, the number and size of individual meals depending on the presence or absence of gastric retention as indicated by the occurrence of vomiting. The weight should be recorded at weekly intervals under comparable conditions, and, except in case of emergency, such adjuvants as iron, dilute hydrochloric acid, and tonics should be withheld. As the general condition dictates, the patient is encouraged to be up, to exclude the transient benefit of rest in bed which is so important in producing remission of symptoms in simple peptic ulcer.

The actual antisyphilitic treatment should embrace the three complementary drugs—namely, iodides, heavy metal, and trivalent arsenical. The dose of iodide should be high and should rapidly reach a maximum of gr. 90 daily. It is interesting to note that Fenwick (1901) found that ordinary gastritis was aggravated by iodide but that syphilitic gastritis quickly reponded to it. The choice of heavy metal will now probably favour bismuth by intramuscular injection, rather than mercury, because of its easier administration and more favourable ratio of therapeutic to toxic dose. In the absence of the usual contra-indications a course of twelve intravenous injections of trivalent arsenical of the "914" group should be given in alternating doses of 0·3 g. and 0·45 g. twice weekly (total 4·5 g.). Great general debility in these cases is not a deterrent to active arsenical therapy, to which they show a very satisfactory response. Smith (1930) found in six cases that intensive treatment was unaccompanied by any unfavourable reactions or complications. In 1922 McNee noted that opinion, especially in France, favoured the use of mercury and particularly iodides, rather than arsphenamine, in the treatment of gastric syphilis. Later experience has, however, modified this view. Antisyphilitic treatment must be sustained

at appropriate intervals for at least two years after the relief of symptoms.

Although the treatment of gastric syphilis is essentially medical, operation may be required to overcome contracture of the stomach. This complication may be present because the condition is diagnosed and treated late or because of fibrosis of the lesion under treatment (McCann and Dumphy 1931). In view of the latter it appears reasonable where the stomach is extensively involved to use less active measures than those suggested above, and to give bismuth and iodide alone, at least in the early stages. Cases which show stenosis should receive one or two courses of treatment before operation, as Stokes (1934) has pointed out that convalescence is much shortened if this is done. The indications for, and measures employed in, the surgical treatment of gastric syphilis have been described by Priestly and Walters (1934) and Evarts Graham (1922). That surgical measures, when necessary, should be as conservative as possible is indicated by the reports of Singer and Steigman (1934), Crohn (1927), Rowlands and Simpson (1932), and Goldhamer (1933), in which the four patients developed pernicious anæmia after partial gastrectomy, some also showing evidence of subacute combined degeneration of the cord. Poole and Foster (1931) report a similar complication following total resection of the stomach.

PROGNOSIS

Although the best results depend on intelligent and thorough treatment begun at an early stage, it is surprising in what advanced cases symptomatic cure has followed adequate antisyphilitic therapy. There have been many individual instances in which a palpable mass has also disappeared under treatment (Einhorn 1902, Hausmann 1924, Pezoldt 1915, and Sherren 1921), and in Smith's six cases (1930) the results of treatment were uniformly good. O'Leary (1931) reported cure in 37 per cent. of his 89 cases and improvement in symptoms in a further 27 per cent., while the remainder failed to benefit from medical treatment because of gross deformity and contracture of the stomach.

Even better results may be expected when the condition receives wider and earlier recognition and more intelligent treatment.

CASE REPORT

The patient, a retired engineer of 65, was admitted to the venereal diseases wards of Mill-road Infirmary, Liverpool, on July 6th, 1937. He complained of epigastric discomfort aggravated at intervals by paroxysms of severe shooting pain. The symptoms appeared first in March, 1935, and lasted for 10 weeks. They returned in December, 1935, for 3 weeks and again in March, 1936, since when they had not left him. The pain was not related to food and was not influenced by alkaline powders. It was most severe when he lay on his back and he obtained some relief by lying prone. There had been no vomiting except for mild hæmatemesis, associated with melæna, for 3 days during May, 1937. Although his appetite was moderate he had lost almost 2 stone in weight, his original maximum having been 9 st. 3 lb. The bowels were constipated, there had been no diarrhœa, and micturition was normal. Recently he had experienced some dizziness. He denied having had syphilis but his wife who was now dead had had three miscarriages.

The patient was deaf and was anæmic and emaciated. His temperature and pulse and respiration-rates were normal. Scars were present in the left groin but no penile scar could be seen. All his teeth were artificial and his tongue showed a mild atrophic glossitis. The abdominal wall was almost scaphoid and there was a tender mass the size of a walnut in the mid-epigastrium. The lower border of the liver and the left kidney were palpable and there was some slight resistance to palpation over the epigastrium. Rectal examination revealed no abnormality. Gross arterio-sclerotic changes were present but without cardiac enlargement. The heart sounds were rather weak and there were occasional extrasystoles. There was a harsh generalised systolic murmur best heard over the aortic area, and the aortic second sound was accentuated. The blood pressure was 200/120. There was no other evidence of aneurysm. Mild bronchitis and emphysema were present and the breath sounds were diminished over the lower lobe of the right lung. There was no clubbing of the fingers. The right pupil was larger than the left and both were slightly irregular in outline, otherwise the central nervous system was normal. There was a cataract in the left eye. The urine was normal.

A provisional diagnosis of carcinoma of the stomach, possibly with secondaries in liver and lung, was made.

Investigations gave the following results: Blood Wassermann reaction strongly positive. Cerebro-spinal fluid: cells 2 per c.mm.; total protein 0·035 per cent.; globulin and Lange curve normal; Wassermann reaction positive in a dilution of 0·5 c.cm., negative in further dilutions. Gastric analysis: achlorhydria; excess mucus; a trace of bile and starch but no blood or pathological cells; fasting volume 36 c.cm.

Radiography of the chest revealed a large dilated atheromatous aorta with an aneurysm of the distal part of the arch. Radiography of the stomach with barium showed "defect in the middle third of the stomach due to ulcer crater; malignancy cannot be excluded. Rapid emptying rate" (see upper half of Figure on Plate). Fæces were negative for occult blood.

In view of the slender possibility of the gastric lesion being syphilitic it was decided on July 15th to carry out the therapeutic test for gumma of the stomach. The patient was put on an ordinary diet including meat, potatoes, and vegetables, but was kept in bed on account of his poor general condition. He was given potassium iodide gr. 10 t.d.s., iron and ammonium citrate gr. 30 t.d.s., and liquid paraffin by the mouth, and 0·1 g. of metallic bismuth was injected intramuscularly twice a week. His weight at this time was 7 st. 12 lb. The iodide dosage was increased by stages until after a fortnight he was receiving gr. 90 daily.

Throughout the ensuing six weeks, during which he received a total of 1·2 g. of metallic bismuth and 3150 grains of potassium iodide, the patient progressively lost weight until he was only 7 st. 4½ lb., and, although his choice of diet was not restricted, his appetite deteriorated. His pain had diminished when the bismuth injections were begun, but it still remained his chief complaint.

On August 27th the iodides and bismuth were discontinued and intravenous injections of 0·075 g. neoarsphenamine twice a week were cautiously started. After six injections the dose was raised to 0·15 g. The clinical response to this régime was most remarkable. The patient's pain decreased and in a month had gone completely. His appetite improved, the original epigastric mass was no longer palpable, and his weight steadily increased. The pain from his aneurysm also abated and from this time the patient was able to be up and to walk about without discomfort.

He was discharged to the clinic for further injections on Oct. 1st at which time he weighed 7 st. 12 lb. and his radiological report was "stomach and duodenum show normal appearance and empty normally" (see lower half of Figure). He remained under observation and by Nov. 11th he had received a total of 3 g. neoarsphenamine and weighed 8 st. 13 lb. Gastric analysis at this time still showed

achlorhydria, and hypochromic anæmia was also present. The arsenic injections were stopped on Dec. 21st by which time 4·5 g. had been administered. Dilute hydrochloric acid and Blaud's pill gr. 15 t.d.s. were then prescribed and his weight reached 9 st. 1 lb. on Jan. 11th.

In August, 1938, 13 months after the beginning of the therapeutic test, the patient was free of all symptoms, including those formerly referable to his aneurysm, and had regained his normal weight.

SUMMARY

Attention is directed to the existence of organic gastric syphilis as a clinical entity.

It is possible to recognise the disease clinically and to treat it conservatively by antisyphilitic measures. A therapeutic test carried out strictly according to the technique here described is often more valuable than microscopical examination of excised tissue, for the pathological findings are apt to be equivocal.

A case is reported which so far has satisfied the necessary diagnostic criteria.

REFERENCES

Albu, A. (1921) Die Syphilis des Magens, Berlin, vol. v.
Allbutt, T. C. (1921) *Brit. med. J.* **2**, 177.
Andral, G. (1834) Clinique Medicale, Paris, 3ED, vol. ii, p. 201.
Boas, K. (1925) Diagnostik u. Therapie der Magenkrankheiten, Leipzig, 8ED and 9ED.
Brugsch, T., and Schneider, E. (1915) *Berl. klin. Wschr.* **52**, 601.
Cabot Case 21,182 (1935) *New Engl. J. Med.* **212**, 839.
Carman, R. D. (1918) *Surg. Gynec. Obstet.* **27**, 426.
Carns, M. L. (1936) *Wis. med. J.* **35**, 725.
Chiari, H. (1891) *Int. Beitr. wis. Med.* **2**, 295.
Crohn, B. B. (1927) Affections of the Stomach, Philadelphia, p. 797.
Downes, W. A., and LeWald, L. T. (1915) *J. Amer. med. Ass.* **64**, 1824.
Eckhoff, N. (1931) *Guy's Hosp. Rep.* **81**, 477.
Einhorn, M. (1902) *J. Amer. med. Ass.* **39**, 1051.
Eusterman, G. B. (1917) *Amer. J. med. Sci.* **153**, 21.
— (1931) *J. Amer. med. Ass.* **96**, 173.
Fenwick, S. (1901) *Lancet*, **2**, 835.
Fitts, J. B. (1930) *Ann. intern. Med.* **4**, 628.
Galloway, D. J. (1922) *Brit. med. J.* **1**, 217.
Glaser, F. (1921) *Med. Klinik*, **40**, 1199.
Gmelin, E. (1925) *Beitr. klin. Chir.* **134**, 587.
Goldhamer, S. M. (1933) *Surg. Gynec. Obstet.* **57**, 257.
Graham, E. A. (1922) *Ann. Surg.* **76**, 449.
Grun, G. (1932) *Urol. cutan. Rev.* **36**, 243.
Harris, S., Jr., and Morgan, H. J. (1932) *J. Amer. med. Ass.* **99**, 1405.
Hartwell, J. A. (1925) *Ann. Surg.* **81**, 767.
Hausmann, T. (1911) *Münch. med. Wschr.* **108**, 511.
— (1924) *Z. klin. Med.* **98**, 432.
Herman, C. (1927) *Brit. J. Radiol.* **32**, 296.
Hurst, A. F. (1922) *Guy's Hosp. Rep.* **62**, 188.
LeWald, L. T. (1931) *J. Amer. med. Ass.* **96**, 179.
Luria, R. (1929) *Arch. VerdauKr.* Suppl. **46**, 1.
McCann, J. C., and Dumphy, J. J. (1931) *New Engl. J. Med.* **205**, 1273.
Mackay, W. A. (1898) *Lancet*, **2**, 1701.
McNee, J. W. (1922) *Quart. J. Med.* **15**, 215.
McNeil, H. L. (1915) *J. Amer. med. Ass.* **64**, 430.
Merril, A. S., quoted by Moore, A. B., and Aurelius, J. R. (1928).
Moore, A. B., and Aurelius, J. R. (1928) *Amer. J. Roentgenol.* **19**, 425.
Morgan, W. G. (1915) *Amer. J. med. Sci.* **149**, 392.
Morton, C. B. (1932) *Arch. Surg., Chicago*, **25**, 880.
Neugebauer, quoted by Eusterman, G. B. (1917).
Niles, G. M. (1916) *J. Amer. med. Ass.* **66**, 564.
Noguchi, H. (1928) The Newer Knowledge of Bacteriology and Immunology, Chicago, p. 478.
O'Leary, P. A. (1930) *Coll. Pap. Mayo Clin.* **22**, 507.
— (1931) *Amer. J. Surg.* **11**, 286.
Osler, W. (1912) The Principles and Practice of Medicine, London, 8ED, p. 275.
Pater, H. (1926) Nouveau Traite de Medicine, Paris, p. 624.
Pezoldt (1915) *Arch. Schiffs- u. Tropenhyg.* **19**, 151.
Pilot, I., and Davies, D. J. (1924) *Arch. intern. Med.* **34**, 313.
Poole, A. K., and Foster, L. C. (1931) *J. Amer. med. Ass.* **96**, 2187.
Priestly, J. T., and Walters, W. (1934) *Surg. Gynec. Obstet.* **58**, 1030.
Rehfuss, M. E. (1927) Diagnoses and Treatment of Diseases of Stomach, London, p. 901.
Rowlands, R. A., and Simpson, S. L. (1932) *Lancet*, **2**, 1202.
Sherren, J. (1921) *Lancet*, **2**, 691.
Singer, H. A. (1933) *Arch. intern. Med.* **51**, 754.
— and Dyas, F. G. (1928) *Ibid*, **42**, 718.
— and Meyer, K. A. (1929) *Surg. Gynec. Obstet.* **48**, 23.
— — (1933) *Amer. J. Surg.* **21**, 1.
— and Steigman, F. (1934) *Amer. J. Syph.* **18**, 444.
Smith, D. (1930) *Brit. med. J.* **2**, 773.
Smithies, F. (1915) *J. Amer. med. Ass.* **65**, 572.
Stokes, J. H. (1934) Modern Clinical Syphilology, Philadelphia.
— and Brown, P. W. (1922) *Amer. J. med. Sci.* **164**, 867.
Symmers, D. (1916) *J. Amer. med. Ass.* **66**, 1457.
Turnbull, H. M. (1922) *Proc. R. Soc. Med.* **15**, 9.
Yeo, K. J. (1931) *Brit. J. Radiol.* **4**, 510.

MITRAL STENOSIS

WITH CHRONIC PASSIVE CONGESTION SIMULATING MILIARY TUBERCULOSIS

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(WITH ILLUSTRATION ON PLATE)

THE passive congestion of the lung caused by mitral stenosis may present a radiographic picture closely resembling that of miliary tuberculosis. The condition is rare, for Hoyle and Vaizey (1937) state that miliary shadows due to congestion are usually associated with actual heart failure. When they are seen in the absence of heart failure they are not uncommonly attributed to tuberculosis, and since the mistake is of some practical importance the following case record may be useful.

The patient, a well-developed, slightly obese man aged 29, was first admitted to hospital in 1937 complaining of palpitation, dyspnœa on exertion, and slight cough with a trace of mucoid sputum. He had no fever and his sputum did not contain tubercle bacilli. He had had rheumatic fever at six years of age. There were no abnormal physical signs in the lungs but he was found to be suffering from mitral stenosis. A radiogram of his chest (Fig. I on Plate) showed not only an abnormal heart outline due to mitral disease but also many more or less discrete opacities throughout both lungs, including the apices, although less numerous there than elsewhere. Scattered through all three zones of the right lung there were half a dozen small calcified foci, and one calcified spot was present near the left hilum. Partly, no doubt, because of this evidence of old tubercle a diagnosis of mitral stenosis with acute miliary tuberculosis was made. (At another hospital this diagnosis was modified to chronic miliary tuberculosis.) He was sent to a sanatorium, where he remained for six months, but (according to his own account) all his symptoms grew worse.

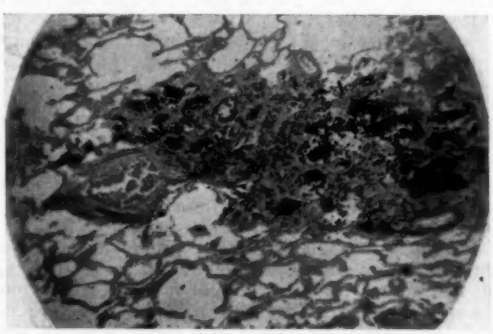

FIG. II—Microphotograph showing perivascular and peribronchial area of fibrosis with blood pigment.

I first saw him on discharge from the sanatorium. At that time he was suffering from auricular fibrillation, and had, besides those symptoms previously listed, almost constant precordial pain. Apart from a few crepitations at the lung bases there were no abnormal signs in the lungs. He was readmitted to hospital where his condition seemed to improve and the fibrillation ceased. He was still afebrile. On the fourteenth day after admission he died suddenly, without pain or distress. The immediate cause of death was not satisfactorily determined, but the pathologist's report is instructive.

Summary of post-mortem findings.—"The heart shows hypertrophy and dilatation. There is an advanced degree of stenosis of the mitral valve of the button-hole variety, with some calcified nodules in the flaps. No other valvular lesions are noted. There are two or three 'milk spots' in the pericardium, but no other lesions. The pleura shows some terminal plastic pleurisy at the right base. The lungs are very much reddened and engorged and show the usual amount of carbon pigment. There are a few small discrete calcified nodules in the peripheral portions of the lungs, but no sign of active tuberculosis, miliary or otherwise. Microscopic sections of the lungs (Fig. II) show large numbers of small perivascular and peribronchial areas of fibrosis with a small amount of carbon pigment and much blood pigment in the interstices of the fibres. A good deal of this blood pigment lies within the macrophages—i.e., the 'heart-failure cells.' Here and there is some hypertrophy of small lymph nodes. No giant cells, epithelioid cells, tubercle bacilli, or areas of caseation are seen."

DISCUSSION

According to Twining (1938) the miliary shadows seen on radiography may be caused by a combination of swollen end-on vessels and alveoli filled with heart-failure cells. Köhler (1935) states that the shadows are produced by distinctly circumscribed "heart failure cellular nodules" (borrowing the term from H. Rosenhagen). This latter description more nearly fits the case under discussion and represents, probably, a late stage of the disease when fibrosis has taken place about the cells which, owing to the obstruction in and damage to the pulmonary vessels, have been extravasated into the alveolar spaces. At this stage therefore the pathological changes have become more or less permanent and the radiological picture is not likely to change. In the case described the appearances in the radiogram did not alter appreciably during eight months of observation. Here, then, is an important point of differentiation from miliary tuberculosis. Unfortunately it is not sufficient to exclude chronic miliary disease.

Exclusion of miliary tuberculosis by means of a single skiagram may be impossible. Characteristically, in the miliary type of chronic passive congestion the spots decrease in size and incidence towards the periphery, and the apices are clear, whereas the middle zones are densely packed with shadows and the bases only slightly less affected. Sometimes these typical features are not so evident. There may be no apparent diminution in the size and number of the nodules towards the periphery, the apices may contain a few shadows, and the bases may be relatively spared. Another fine point of differentiation, which unfortunately cannot always be demonstrated, is that whereas in the vascular disease the nodules appear to be of uniform opacity and relatively clear-cut outline, in miliary tuberculosis the larger foci have a centre of relatively low density and an outline which merges gradually with the surrounding field.

Ultimately, however, the differentiation must be made clinically. In the case described, had radiography not been undertaken, no confusion could have arisen, since there was nothing in the patient's history or condition to suggest tuberculosis. Furthermore, many authorities could be quoted in support of the almost axiomatic contention that persons suffering from mitral stenosis of rheumatic origin very rarely, or never, contract pulmonary tuberculosis. Fishberg (1932) says:—

"While it is possible that patients with mitral stenosis should become tuberculous yet this is exceedingly rare. In fact it has been my rule never to diagnosticate tuberculosis in one showing signs of disease of the mitral valve and cardiac hypertrophy or dilatation, irrespective of the physical signs elicited while examining the lungs, unless the sputum reveals tubercle bacilli."

The presence of mitral disease should, then, engender extreme wariness when abnormal shadows present themselves in the lung fields, and the diagnosis of pulmonary tuberculosis should only be made when Koch's bacillus, the only proof of tubercle, is found in the sputum.

CONCLUSION

The value of this report lies in its illustration of points that may arise in connexion with the differential diagnosis of miliary shadows in a radiogram of the chest. Briefly, these are: (1) Miliary tuberculosis is not the only condition which may give rise to miliary opacities in the lung. (2) Chronic passive congestion arising from mitral stenosis may present an X ray picture indistinguishable from that of miliary tuberculosis. (3) The character and distribution of the shadows, although they may suggest the correct diagnosis, are not in themselves sufficient to differentiate the two conditions.

In conclusion I wish to acknowledge my thanks to the medical officer of health for the County of London and the medical superintendent of Bethnal Green Hospital for lending the pathological specimens; to Dr. S. Roodhouse Gloyne who examined the organs and whose report is reproduced; and to Dr. H. Tylford Howell for permission to publish the case.

REFERENCES

Fishberg, M. (1932) Pulmonary Tuberculosis, London.
Hoyle, C., and Vaizey, M. (1937) Chronic Miliary Tuberculosis, London.
Köhler, A. (1935) Röntgenology (translated by A. Turnbull), London.
Twining, E. W. (1938) A Text Book of Diagnosis by British Authors, London.

ACTION OF SULPHANILAMIDE ON LEUCOCYTES

A REPORT ON FIFTY AMBULANT PATIENTS

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SULPHANILAMIDE is now widely prescribed not only for those infections which it is known specifically to affect but also empirically. The general public have also learnt of its use in gonorrhœa and other diseases, and have up to now been able to obtain it without prescription and to administer it to themselves while carrying on their ordinary work. Nevertheless serious toxic effects are rare. Agranulocytosis, however, has caused a high mortality in apparently hypersensitive subjects, and we have made serial observations on the leucocytes of 50 ambulant patients receiving the drug to determine whether it produces any toxic leucocytic depression in the average patient. So far, 8 cases of agranulocytosis with six deaths have been reported following the administration of drugs of the sulphanilamide group, and, while some of the fatalities may have been partly due to pre-existing toxins of infection, the circumstantial evidence is strong enough to implicate the sulphanilamide. The number of deaths due to the drug must be an infinitesimal fraction of the number of persons taking it and benefiting by it, but it is a disturbing thought that

there must have been others unreported or undiagnosed. The reported fatal cases were given a rather larger dosage than we have employed in our series, and this must not be lost sight of in assessing the factors responsible for the white cell change.

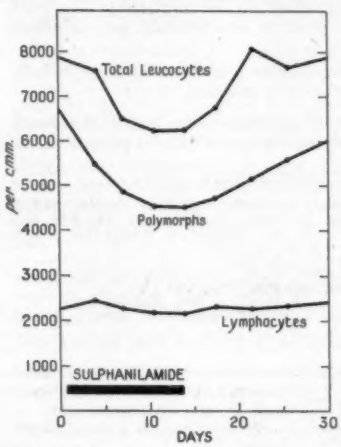

FIG. 1.—Average total leucocyte, polymorph, and lymphocyte counts in the 50 patients.

Plumer's (1937) case was one of subacute bacterial endocarditis in a woman of 54; 46 g. of Prontylin were given in 32 days, and the white cell count fell from 26,000 to 400 per c.mm., with death on the 36th day. Borst (1937) reported a death from agranulocytosis, with terminal count 960 per c.mm., after the intermittent administration of 64 g. of Prontosil flavum over 39 days in a patient aged 61 with urinary infection. Young (1937) performed serial white counts on a fatal case of agranulocytic angina in a man of 53 suffering from acute rheumatism. He had received 54 g. of sulphanilamide in 18 days and his polymorphs fell from 6600 to 0. Autopsy showed a complete aplasia of the myeloid elements of the bone-marrow. Model's (1937) patient was a man aged 20 with acute rheumatism, who received 58 g. of Proseptasine in 18 days. His white count fell from 6000 to 300 per c.mm. with total absence of polymorphs, and he died on the 21st day. Jennings and Southwell-Sander (1937) reported a case of complete agranulocytosis following the administration of 94 g. of sulphanilamide in 21 days to a woman of 39 with ulcerative colitis. Serial counts showed a drop from 5000 to 444 in the white cells, polymorphs being absent. This patient recovered. Schwartz, Gavin, and Koletsky (1938) gave a male syphilitic of 32 61 g. of sulphanilamide in 22 days; his white count fell from 8000 to 2000 with absence of polymorphs and he died on the 29th day. The marrow showed absence of adult polymorphs and myelocytes. Berg and Holtzman (1938) reported a fatal case of agranulocytic angina in a man aged 22 with gonorrhœa, who received 38 g. of sulphanilamide in 27 days. The white count fell to 1600 with 1 per cent. polymorphs just before death. Allen and Short (1938) treated a girl of 18, suffering from an acute Bartholin's abscess, with 18 g. of sulphanilamide in 19 days; the white cell count fell from 10,500 to 2400 with a complete absence of neutrophils (lymphocytes 48 per cent., monocytes 39 per cent., eosinophils 8 per cent., basophils 5 per cent.). Recovery was spontaneous. To these 8 cases may be added the 3 others mentioned by Touraine, Durel, and Baudouin (1937) as occurring in their clinic.

Animal experiments are few. Gay and Clark (1937) noted a rise in the white count with an increase in the monocytes in rabbits experimentally infected with streptococci; no degenerative changes were seen in the polymorphs. Kreutzmann and Carr (1938) could find no change in the white count after giving 0·25 g. of Prontosil per kg. body-weight to rabbits, but they did observe a mild depression of the bone-marrow. Marshall, Cutting, and Emerson (1938) found no white cell change in 4 rabbits and 2 dogs after the administration of sulphanilamide.

Insufficient control by serial white counts has been used on patients receiving the drug to draw any definite conclusion. Campbell (1938) found no significant change in the white count before and after the administration of the drug in 10 cases. Bigler, Clifton, and Werner (1938) performed daily white counts before, during, and after giving the drug in a few cases and found no alteration save a small rise in the count after cessation of the treatment. They concluded, however, that there was a slight depression of the leucocytes. Evans and Gaisford (1938) using M. & B. 693 (2-(*p*-aminobenzenesulphonamido) pyridine) in patients with pneumonia noticed no difference in their serial white counts from those of controls. In their patients, of course, the initial white counts were high. Fleming (1938), employing carefully controlled methods, concluded that M. & B. 693 had no deleterious action on leucocytes at any rate in vitro.

We have investigated the leucocyte response and the toxic symptoms in a larger series of mixed ambulatory cases treated with sulphanilamide than has hitherto been reported. The technique used was as follows. After the usual routine clinical examination and a preliminary total blood count, the patient was given 0·5 g. of the drug three times a day for 14 days, instructions being given to avoid saline purgatives and the common sulphur-containing foods. Serial total and differential white counts were made with ordinary standard pipettes twice a week during the administration of the drug and for the next 14 days following its cessation. All counts, with very few exceptions, were carried out by the same observer (C. J. C. B.) at the mid-fast period between breakfast and lunch, to lessen the known daily fluctuations as much as possible. All precautions were taken to ensure the accuracy of the counts. We were careful to exclude any patient who had had previous drug treatment or who had presented any symptoms of drug idiosyncrasy in the past, selecting as mixed a batch as possible, such as would be handled by the general practitioner. The patients were all women out-patients. Of the 56 cases, 17 were normal controls, 20 had chronic cervical erosions of old standing, without constitutional symptoms and in all good faith non-specific, 9 had a chronic urinary infection without fever and showing only local symptoms, 9 had acute gonococcal infections without systemic spread, and 1 was syphilitic. We excluded 6 cases, because they showed either a leucocytosis or a leucopenia at the preliminary examination; their blood counts, nevertheless, were made regularly and no specific difference could be detected on comparison with the results obtained in the other 50 cases.

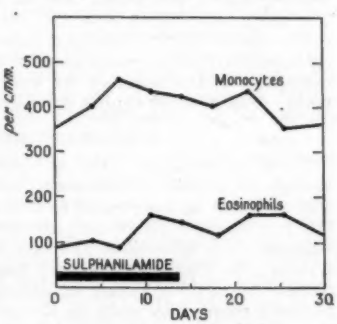

FIG. 2.—Average total monocyte and eosinophil counts.

BLOOD CHANGES

Of these 50 cases, the leucocyte count in 32 showed no marked variations—i.e., at no time was a leucopenia noted. In 14 the count fell to between 5000

and 4000 per c.mm. and in 4 cases to between 4000 and 3000. Of the total counts that fell below the threshold figure taken for leucopenia (5000 per c.mm.) the lowest counts coincide with the end of the first week in 2 cases, the second week in 3 cases, and the third week in 9 cases. It is of interest that of the counts below 4000 all four occurred in the third week. The lowest count met with in this series was 3200 on two occasions. As can be seen from Fig. 1 there was a tendency for the average total leucocyte count to fall steadily during the first week and to remain low for the next fortnight, rising to normal again by the end of the third week. The standard deviation of the counts observed on the different days of treatment was practically constant, being approximately ±1500 per c.mm.

Polymorphs.—In 23 cases (46 per cent.) the polymorph count at some time fell below 3000 per c.mm., this figure being taken as the lower limit of normal. In 12 cases the figure fell below 2500, and in 5 cases below 2000. Almost invariably the lowest figure was found at the end of the second or beginning of the third week. This downward trend of the polymorph count is well shown in Fig. 1.

Lymphocytes.—These showed little or no change and the average figures in the 50 cases follow an almost flat curve (Fig. 1).

Monocytes.—Taking as the upper limit of normal a monocyte count of 500 per c.mm., it was found that in 22 cases (44 per cent.) the count rose above this level and in 9 cases above 750. The highest figure reached was 935 monocytes out of a total of 5500 leucocytes. These changes were most common during the second and third weeks. Fig. 2 shows the average monocyte count in the whole series.

Eosinophils.—In 7 cases an eosinophilia of over 400 per c.mm. was noted, and in 3 it exceeded 500. The maximum figure was 870 out of a total white cell count of 8700. Usually a rash accompanied this eosinophilia, but in some cases a moderately severe rash was unaccompanied by eosinophilia and vice versa. The average counts are given in Fig. 2.

TOXIC SYMPTOMS

Toxic symptoms such as headache, dizziness, vertigo, depression, listlessness, somnolence, nausea, and tinglings in hands and feet occurred in 35 cases (70 per cent.). There was no definite relationship between such symptoms and any blood change. In 2 cases the dizziness was very marked and accompanied by such a feeling of disorientation that the patients refused to walk in the streets alone. (All these patients were ambulatory and usually doing their ordinary work.) Such toxic symptoms were present most often in the first week and but rarely in the second, in other words they usually recovered despite continued use of the drug. Cyanosis was seen in 9 cases to a greater or less extent and again there was no relation to any blood change. Only 1 case occurred in the first week, 4 in the second (one at the end of this week), and 4 in the third. Rashes were present in 13 cases, one of which was cyanosed. The rash was commonly urticarial in type and irritable. It appeared most often in the second week but in some cases was seen in the first or even delayed till some days after the drug was stopped in the third. It was noticed, as has been observed before, that both the rash and the cyanosis may disappear spontaneously even if the drug is continued.

SUMMARY

Serial leucocyte counts performed on 50 ambulant patients receiving 21 g. of sulphanilamide in 14 days showed that in 46 per cent. of cases there was a transient polymorph leucopenia and in 44 per cent. a monocytosis. These changes were usually found between the 7th and 20th day after administration of the drug.

Toxic symptoms arose in 70 per cent. of cases, but these bore no definite relationship to variations in the white count.

The mild leucopenia found is significant, especially as the dosage employed was small.

We wish to express our thanks to Miss Helen Snow for her coöperation in dealing with the patients.

REFERENCES

Allen, J. G., and Short, C. L. (1938) *New Engl. J. Med.* **219**, 6.
Berg, S., and Holtzman, M. (1938) *J. Amer. med. Ass.* **110**, 370.
Bigler, J. A., Clifton, W. M., and Werner, M. (1938) *Ibid*, p. 343.
Borst, J. G. G. (1937) *Lancet*, **1**, 1519.
Campbell, C. M. (1938) *Ibid*, **1**, 247.
Evans, G. M., and Gaisford, W. F. (1938) *Ibid*, July 2nd, p. 14.
Fleming, A. (1938) *Ibid*, July 9th, p. 74.
Gay, F. P., and Clark, A. R. (1937) *J. exp. Med.* **66**, 535.
Jennings, G. H., and Southwell-Sander, G. (1937) *Lancet*, **2**, 898.
Kreutzmann, W. B., and Carr, J. L. (1938) *Proc. Soc. exp. Biol., N.Y.* **38**, 19.
Marshall, E. K., Cutting, W. C., and Emerson, K. (1938) *J. Amer. med. Ass.* **110**, 252.
Model, A. (1937) *Brit. med. J.* **2**, 295.
Plumer, H. E. (1937) *New Engl. J. Med.* **216**, 711.
Schwartz, W. F., Gavin, C. F., and Koletsky, S. (1938) *J. Amer. med. Ass.* **110**, 368.
Touraine, A., Durel, P., and Baudouin, A. (1937) *Bull. Soc. franç. Derm. Syph.* **44**, 2072.
Young, C. J. (1937) *Brit. med. J.* **2**, 105.

THE TREATMENT OF URINARY INFECTIONS IN THE PUERPERIUM

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In 1933 Fuller and Colebrook reported on 54 cases of puerperal infection of the urinary tract treated in Queen Charlotte's Hospital by a ketogenic diet. In 24 the urine became sterile within seventeen days. During 1934–36 this method gradually gave place to the less troublesome and less unpleasant treatment with mandelic acid (Rosenheim 1935), and the results of this were in general similar or perhaps rather better. Since 1937, following the lead of Kenny, Johnston, and von Haebler (1937), sulphanilamide has been used in a number of cases. The present paper sets out the impressions so far gained of these two latter forms of treatment; it does not attempt a final comparison of them.

Of the 352 patients admitted to Queen Charlotte's Isolation Hospital during 1937 with a diagnosis of puerperal fever or puerperal pyrexia, 119—i.e., 34 per cent. of the total—were found to have a urinary tract infection either on admission or at some time during their stay in hospital. A most striking feature of this series was the infrequency of symptoms or signs pointing to involvement of the urinary tract. Apart from pyrexia, rapid pulse-rate, and occasionally rigors, urinary symptoms were absent in 78 of these patients (66 per cent.). In the remaining 41, the most common complaints were as follows:—

Dysuria or scalding	18
Retention of urine	13
Delay in starting act of micturition	11
Frequency	9
Renal pain and tenderness	7

Often these symptoms were combined—dysuria with frequency being the commonest association.

Particular emphasis should, I think, be laid on the significance of retention. Patients are often admitted to hospital, sometimes even from nursing-homes and other hospitals, with distended bladders. On interrogation a clear history of partial retention of urine due to incomplete emptying of the bladder is obtained. Here are two extreme examples.

The first woman, admitted from private practice on the fifth day of the puerperium, had a history of "gradual enlargement of the uterus since delivery, possibly due to concealed hæmorrhage; micturition normal." On catheterisation 7½ pints of urine were withdrawn, and the abdominal swelling disappeared.

The other, admitted from a nursing-home on the tenth day after delivery with extreme mental confusion, was found to have distension below the level of the umbilicus. The distension had been recognised, and a flatus tube passed on several occasions in order to relieve it. In this instance 4 pints of urine were obtained by catheterisation. The possibility of distended bladder was indignantly repudiated by the nursing-home authorities, as "the patient had passed urine immediately prior to transfer."

No attempt was made to localise the exact site of the urinary tract infection in the 1937 cases, but there is little doubt that they resembled closely a series of 14 cases investigated in this hospital during 1933–34. Mr. C. Frankau and Mr. M. F. Nicholls, who performed cystoscopy and ureteric catheterisation on these 14 patients (and to whom I am indebted for permission to refer to them), found that the infection was often associated with a congestive condition of the trigone, the remainder of the mucosa being of normal appearance. The conclusion drawn was that a proportion of puerperal bladder infections were due to trauma, in the form of local bruising of the bladder wall during parturition. In other cases definite evidence of involvement of one or both renal pelves was found. The results showed that in 5 out of the 14 cases, although the urine contained large numbers of bacteria, there was no pus and therefore presumably no true infection of tissues.

In the present series of 119 cases, pus cells were recognised microscopically in 89, and in the remainder bacteria without pus were present.

These findings show the necessity for caution in assessing the results of treatment in such a group of patients as are here under consideration. In about a quarter of the total a diagnosis of bacteriuria was made on bacteriological findings and the success or failure of treatment was judged on similar criteria. It may however be added that in every case where there had been clinical signs or symptoms referable to the urinary infection, these subsided as soon as the number of bacteria in the urine was substantially reduced.

The predominant causative organisms were found in the following frequency:—

Bacillus coli	64
Staphylococci (*aureus* and *albus*)	17
Streptococcus fæcalis	15
Streptococcus hæmolyticus	15
Others	8

In the majority of the cases culture yielded a pure growth of one or other of these organisms; in the remainder the infection was mixed.

Genital tract infection was commonly present, as evidenced by such signs as purulent discharge, uterine tenderness, and abundant growth of pathogenic organisms from high vaginal swabs. In only 10 instances was the genital tract considered to be free of infection and the urinary tract the sole source of morbidity. Organisms were isolated from the vagina as follows:—

S. hæmolyticus	44
B. coli	37
Staphylococci	32
S. fæcalis	14
Anaerobic streptococci	14
Others	37

A direct correspondence between the predominant organisms found in genital and urinary tracts was noted in 57 cases; in the remaining 42 no such correspondence was noted. The genital tract infections showed a wide variation in severity, ranging from mild local infections to fulminating puerperal fever. The most constant finding was trauma of the birth canal in the form of perineal and vaginal lacerations. The treatment of the urinary tract infection in many of these patients received scant consideration as the genital tract infection was considered of primary importance.

TREATMENT

Of these patients 79 were treated with sulphanilamide in the form of Streptocide (Evans), 21 with ammonium mandelate in the form of Mandelix (B.D.H.), and 6 with both drugs in separate courses. Another 13 cases were considered unsuitable for either form of treatment, by reason of concurrent anæmia or evidence of impaired hepatic or renal function.

During the early part of the year mandelic acid was the treatment of selection for uncomplicated *B. coli* urinary infections. Latterly it has been used particularly for infections by *Streptococcus fæcalis*, for *B. coli* infections (when apyrexial) where anæmia suggested caution in the use of sulphanilamide, and for mixed infections by these or other organisms. It was administered in a dosage of 3 g. four times daily, with careful restriction of fluids to two pints daily. The *p*H was estimated every day and the aim was quickly to reach a level of 5·2 as being essential to successful treatment. When the drug was given in the form of mandelix this degree of acidity was usually attained within 48 hours without further measures, and the administration of ammonium chloride was seldom necessary.

During the latter part of the year the general outline of treatment employed was as follows:—

(*a*) Patients with urinary tract infections by *B. coli*, unaccompanied by genital tract infection by *S. hæmolyticus*, were given sulphanilamide 3 g. daily (in three doses) for the first two days, then 2·25 g. daily. If after a week the urine had become sterile, the drug was discontinued; if it had not done so and there was no evidence of toxic effects, it was given for a further three or four days.

(*b*) Patients with a genital tract infection by *S. hæmolyticus* plus urinary tract infection were given sulphanilamide, the dosage varying from 4·5 to 6 g. daily (in three or four doses) according to the severity of the infection, and being reduced gradually, as there was clinical improvement, to 3 g. daily, which was continued for a few days after the temperature reached normal.

With a view to the avoidance of cyanosis due to sulphæmoglobinæmia steps were taken to prevent any accumulation of intestinal gases during the period of treatment—e.g., by the use of vegetable laxatives or liquid paraffin (*not sulphate aperients*) and for the same purpose an enema was usually given before treatment was begun. The diet was light and did not include items rich in sulphur, such as eggs and onions. There was no restriction of fluids.

The results did not show any striking correlation between the *p*H value of the urine and the efficacy of this form of medication.

By both these forms of therapy colon bacilli were eliminated from the urine in an average of 6·5 days from the beginning of treatment. The cost of successful treatment averaged 3*s.* per patient with sulphanilamide, and 12*s.* with mandelic acid. The results are shown in the Table.

EFFECT OF TREATMENT ON URINARY FINDINGS

Infection.	No. of cases.	Sterile in 7 days.	Sterile in 14 days.	Bacterial content much reduced.	Bacterial content unchanged.
I—CASES TREATED WITH SULPHANILAMIDE					
B. coli alone ..	37	25	6	3	3
B. coli + other organisms ..	15	3	3	8	1
S. hæmolyticus alone	9	6	2	0	1
S. fæcalis alone ..	8	0	2	0	6
Other organisms (chiefly staphylococci) ..	10	3	1	4	2
Total ..	79	37	14	15	13
II—CASES TREATED WITH MANDELIC ACID					
B. coli alone ..	12	8	3	1	0
B. coli + other organisms ..	5	0	0	3	2
S. fæcalis alone* ..	4	2	1	0	1
Total ..	21	10	4	4	3
III—CASES TREATED WITH SULPHANILAMIDE + MANDELIC ACID IN SEPARATE COURSES					
B. coli alone ..	2	0	1	1	0
B. coli + other organisms ..	4	0	2	1	1
Total ..	6	0	3	2	1

* During the first three months of 1938 four further *S. fæcalis* infections treated by mandelic acid have become sterile within 7 days.

The follow-up investigation of these patients has unfortunately been very unsatisfactory. Many of them were referred, for their own convenience, to private practitioners and post-natal clinics. No particulars are available of their subsequent progress. About 40, who have reported either in person or by letter, are in good health without symptoms and have been discharged from medical supervision. The urinary findings in 31 patients who did report here on one or several occasions 4–12 weeks after discharge were as follows. Of the 20 whose urine was sterile on discharge, in 17 it was still sterile on subsequent examination and 3 showed a recurrence of bacteriuria. Of the 11 who showed bacteriuria on discharge, in 6 the urine was sterile on subsequent examination, in 2 the bacterial count was reduced and in 3 it was unchanged.

CONCLUSIONS

1. This paper reports on the treatment of 106 cases of puerperal urinary infection, most of which were complicated by a genital tract infection, and many by injuries.

2. Sulphanilamide was given to 79 of these patients, the dosage depending on whether a genital infection coexisted and whether it was streptococcal. In 25 out of 37 pure *B. coli* infections the urine became sterile within a week and in a further 6 it was sterile within a fortnight. Of 9 hæmolytic streptococcal urinary infections 6 were sterile in a week and 2 more within fourteen days.

3. Mandelic acid was given in 21 cases. Of 12 pure *B. coli* infections 8 were sterile within a week and a further 3 within a fortnight; of 8 *Streptococcus fæcalis* infections 6 were rendered sterile within a week and 1 within a fortnight.

4. In mixed urinary infections mandelic acid was sometimes employed to attack a residual bacteriuria after initial treatment by sulphanilamide. In 13 cases neither drug was given, by reason of concurrent anæmia or impaired function of liver or kidneys.

5. Sulphanilamide and mandelic acid have both proved effective in the treatment of puerperal *B. coli* infections of the urinary tract. Sulphanilamide was useful in hæmolytic streptococcal urinary infections, and mandelic acid overcame *Streptococcus fæcalis* infections that appeared to resist sulphanilamide.

I am indebted to Dr. L. Colebrook whose enthusiastic interest has been largely responsible for the completion of this investigation, to the staff of the research laboratories for their willing coöperation, and to the honorary staff of Queen Charlotte's Hospital for permission to analyse and report upon these case records, and for helpful criticism.

REFERENCES

Fuller, A. T., and Colebrook, L. (1933) *Lancet*, **2**, 135.
Kenny, M., Johnston, F. D., and von Haebler, T. (1937) *Ibid*, **2**, 119.
Rosenheim, M. L. (1935) *Ibid*, **1**, 1032.

A TECHNIQUE FOR SPINAL ANÆSTHESIA

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THE varieties of technique and solutions used in spinal anæsthesia show that there is no unanimity of opinion as to which is best; yet I would be so bold as to say that there is a technique so simple, safe, and sure that it puts all others in the background. This technique is that of Etherington Wilson; it was described by him in December, 1933, at the Royal Society of Medicine, and I would recommend all interested to read his original paper. I was so impressed that I started to use the method from that time and have made it my routine anæsthetic for all operations below the xiphisternum at the Royal Portsmouth Hospital and other hospitals and extensively in my private practice. Since that date, in the 3½ years I have used it, I have on no single occasion regretted my choice.

One great essential for a technique in spinal anæsthesia is simplicity; that is, it should avoid all complicated movements of the patient both before and after the anæsthetic solution has been introduced. In the present method the solution is introduced in the sitting position, the patient being kept upright for a certain number of seconds and then laid flat; the table is then tilted to 15° in the head-down position. Nothing more is required and the operation can commence as soon as the towels are in position.

I have added a modification in that I administer Sodium Evipan intravenously so as to have an unconscious patient. Most patients prefer this, and it certainly leaves the surgeon more free to talk or give necessary instructions. It is surprising how long the unconsciousness lasts when the evipan is given in addition to the pre-operative dose of Omnopon and hyoscine to be described. When it

was first used I was pleasantly surprised to find that a patient would remain asleep for an hour or more and so permit most operations to be completed before returning to consciousness. It has been found that most patients when they do wake up are quite unaware that the operation has taken place at all, and they often ask when they are to go down to the theatre, many hours after the operation has been completed.

THE IMPORTANCE OF DETAIL

Having briefly outlined the method I will now give the detailed procedure; and I do feel that it is of the utmost importance that the technique should be carried out correctly to its smallest detail in order to avoid those disappointing failures which one sometimes sees with spinal anæsthesia *but which do not occur* when the technique is carried out correctly.

The solution used is Percaine 1 in 1500 of saline, a hypobaric solution, marketed by Ciba Ltd. The instruments required are: a 20 c.cm. glass syringe, a 10 c.cm. one for giving the evipan, and for local anæsthesia a 2 c.cm. record. The needles necessary are a *fine* spinal anæsthetic needle, which is better provided with a stilette (but it must be the finest-calibre needle); a fine needle for administering the evipan (for it is a great mistake to think that a coarse needle is necessary for intravenous work); and finally a needle for raising the intradermal weal for the local anæsthesia and a needle of about 5 cm. length for anæsthetising down to the ligamenta subflava. A large-bore needle for mixing the sodium evipan is useful and time-saving.

Other requirements are a sterile dish containing warm sterile water to which a few drops of dilute hydrochloric acid are added, some local anæsthetic solution such as Novocain or Planocaine and a tiltometer for measuring the tilt of the table. All the syringes are sterilised by boiling or by very prolonged immersion in spirit, after which they must be well rinsed; the ampoules of percaine, sodium evipan, and distilled water for the latter are sterilised by immersion in spirit. The syringes and ampoules are placed in the dish of warm acidulated water before use so that all are thoroughly warmed through.

The syringe for the local anæsthesia is filled and fitted with the smaller needle, and with the larger needle beside it is laid ready for use. The sodium evipan is dissolved in the usual way using the 10 c.cm. syringe and the coarse needle; the syringe is filled with the solution fitted with the fine needle and put handy for use. Finally the ampoule of percaine is opened and the 20 c.cm. syringe filled with the requisite amount—but only when everything is ready for giving the injection; that is when the patient is ready to be sat up and the coverings removed from the back so that the injection can begin at once. Only if this is strictly adhered to is the great essential of the method attained—i.e., the introduction of *warm* anæsthetic solution into the theca. For this purpose also the operator must be skilled in puncturing the dura else time will be wasted and the solution will cool; this is a fruitful source of failure with the unskilled. A good visual conception of the spine and delicate handling are essential. The success of the method depends on the diffusion upwards of the solution in the cerebro-spinal fluid, and therefore the two fluids should be at as near the same temperature as possible; it stands to reason that if 12–15 c.cm. of cold solution is introduced into the cerebro-spinal fluid it will tend to lie at the bottom of the theca and fail to ascend. This is so important that it is a point that should never be lost sight of; and furthermore if the patient's temperature is above normal the temperature of the percaine solution should be raised to correspond.

The injection is given with the patient sitting up and bending well forward so as to open up the interlaminar spaces. A sterile towel is placed on the table behind the patient and the space between the 2nd and 3rd, or the 4th and 5th lumbar spines is identified. Over the selected space an intradermal weal is raised with the local anæsthetic solution, using the fine needle. The 5 cm. needle is introduced through this weal down to the ligamenta subflava and more anæsthetic introduced along this track. The spinal needle is entered along the anæsthetised track and pushed through the dura till a definite tap of fluid is obtained, a few drops only being allowed to escape purely to be sure that the needle is well within the dura. When this is certain the 20 c.cm. syringe, filled with the selected amount of percaine solution, is connected to the needle, and slow but steady injection is made until the syringe is empty; at that point the operator calls out the time for which he wishes the patient to be in the upright position, 20 or 30 seconds as the case may be. The patient is told to sit straight up, and at the expiry of the requisite time is laid flat down and the table is tilted to 15° head-down position. This degree of tilt is such that the patient just begins to slide down the table, so that it is necessary to have the shoulder rests in place as for the Trendelenburg position. It is advisable to have a tiltometer on the edge of the table so that the correct tilt may be given. After five minutes at 15° the tilt can be reduced to 10°, at which the table should be kept for the remainder of the operation. There is no drawback in having such a tilt even in upper abdominal operations for the degree of relaxation and the quiet respirations quite compensate any disadvantage.

With regard to the quantities of percaine solution injected, in order to simplify the technique, I use two quantities and two times only. For all operations below the umbilicus 12 c.cm. of percaine is injected and the upright position maintained for 30 sec. This as a rule gives anæsthesia to above the umbilical line and is suitable for all pelvic work and appendicectomies. For upper abdominal work a "high spinal" is given using 15 c.cm. percaine with 40 sec. in the vertical position. This gives anæsthesia well up to the nipple line and can be used for all upper abdominal operations; I have even used it for a diaphragmatic hernia. This high block is not followed by any appreciable drop in blood pressure of which one hears so much, and in all my cases I have not had one which has caused any anxiety on this score.

When the technique has been carried out in this way it is possible to commence the operation as soon as the towels have been put in place and the surgeon is ready to commence. However, as already stated, I now give sodium evipan in order to abolish psychic shock, a consideration which I think most patients prefer. As soon as the patient is in the tilted position an arm is held out, the upper arm is compressed so as to render the antecubital veins prominent, and the injection given into the selected vein; 3 c.cm. is usually given and a pause made till the patient ceases to count, after which a further quantity is given according to the length of time that it is anticipated the operation will take. I have found it an advantage to give the full 10 c.cm. in upper abdominal operations, as they are as a rule longer and more difficult; and further the subdiaphragmatic area is such a sensitive area that a semiconscious

patient might be disturbed by sensations there even though they were not painful.

As regards the pre-operative preparation of the patient, the general preparation is the same as for a general anæsthetic, but in addition the back is cleaned and prepared in the same manner as the abdomen. The patient is given a hypodermic injection of omnopon gr. ½ and hyoscine gr. 1/150 (the Roche ampoule is used) an hour before the time of operation and finally, just as the patient is brought to the theatre, gr. 1½ ephedrine is given intramuscularly.

SCOPE AND ADVANTAGES

With this technique it is possible to perform any operation below the xiphisternum as the following list shows:—

OPERATIONS PERFORMED UNDER SPINAL ANÆSTHESIA AT ROYAL HOSPITAL, PORTSMOUTH, 1934–38

Cholecystectomy ..	60	Hysterectomy ..	115
Gastrectomy	34	Oöphorectomy ..	32
Gastro-enterostomy ..	41	Colporrhaphy	88
Appendicectomy ..	146	Curettage	36
Colostomy	25	Shortening round ligaments	75
Hæmorrhoids	35	Splenectomy	3
Hernia	105	Miscellaneous	189
Laparotomy	29		

The relaxation is beyond anything obtained by general anæsthesia of a safe degree, and the general "abdominal peace" something which has to be seen to be fully appreciated. It is even possible to perform pelvic operations without resorting to packing off the intestines, a distinct advantage as regards post-operative distension. Another point of great help to the surgeon is that all "visceral tug" is abolished, and this is particularly seen in upper abdominal work—for example when the duodenum is being closed in a partial gastrectomy, or in difficult gall-bladder cases. The advantages to the patients are many and to the surgeon I think incalculable in the relief from all anxiety and the ease of all manipulations and the general peace in the theatre and in the abdomen. All these of course react in the patient's favour. These advantages are particularly seen in a busy hospital practice where many more operations can be carried out in a given time with less fatigue to the operator. Every patient who has had a previous operation under general anæsthesia has said that the new way was much better; in fact, in a great number of cases there is no recollection of the operation having taken place. Unfortunately vomiting is not entirely abolished but it is slight and is not accompanied by the unpleasant taste and smell of general anæsthesia. In many cases there is no sickness. The ease of recovery is a great boon in a hospital ward where convalescent or ill patients are not disturbed by the unpleasant sounds that as a rule accompany recovery from general anæsthesia, and those awaiting operation are not further terrified by the thought of what they will have to go through.

What about the two bugbears of spinal anæsthesia, fall of blood pressure and headaches? All I can say is that in my experience, using the method described, neither has caused any anxiety. In all the upper abdominal operations I have done I have not once had any anxiety from a fall in blood pressure. Every now and then one has a case with severe headache, but they are so few as to be almost negligible.

I have often said that my impression was that the cases of acute appendicitis with peritonitis that I have given a spinal anæsthesia have done much better than when I used general anæsthesia. I have no figures to support this statement, but it is a very definite opinion and I was therefore interested to read a quotation from an article by Mengle (1937) which ends: "The deduction is that any method of anæsthesia which causes deep breathing should be avoided in cases of peritonitis." The method which I have described produces such small intra-abdominal movement that I think my impression is justified, in the face of this experimental work.

In 1248 operations carried out by me with this technique (1013 at the Royal Hospital, 145 at St. Mary's Hospital, and 90 in private practice) there has been no fatality that could be attributed to the method of anæsthesia.

SUMMARY

In about 1250 operations the method of spinal anæsthesia described by Etherington Wilson has given full satisfaction. The abdominal relaxation obtained assists the surgeon, and the procedure is safe and not at all uncomfortable for the patient, especially if unconsciousness is secured with evipan. No anxiety has been caused by any fall of blood pressure, and severe headache has been a rare sequel. Post-operative vomiting is not altogether avoided, but is only slight. To get the best results however it is essential that close attention should be paid to details such as the proper warming of syringes and solutions.

I am indebted to my honorary anæsthetists at the Royal Portsmouth Hospital for their coöperation during the four years we have used it; for while at first I performed the injections myself Dr. R. K. Reeves and Dr. S. Conway now perform them for me.

REFERENCES

Mengle, H. A. (1937) *Arch. Surg* Chicago **34**, 839; quoted in the Medical Annual for 1938, p. 31.
Wilson, W. E. (1933–34) *Proc. R. Soc. Med.* **27**, 323

TWO CASES OF PNEUMOCRANIUM

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The condition that has been variously described as pneumencephalon, pneumocephalus, pneumatocele, aerocele, or pneumoventricle is brought about by the entrance of air into the cranial cavity, usually the result of trauma. In addition to the traumatic variety produced by a fracture involving the internal wall of one of the cranial air sinuses—frontal, ethmoidal, sphenoidal, or temporal—cases have been reported as arising from erosion of the floor of the skull by neoplasms; and collections of gas, as distinct from air, may be produced by gas-forming organisms, as in the first case described by Chiari in 1884. Some of the terms applied to this condition are not altogether fortunate, since they do not sufficiently distinguish it from what has long been known as "pneumatocele cranii," in which there is a localised collection of air beneath the scalp following a fracture of the external wall of a frontal sinus or the mastoid cells. This latter condition is in itself of no great gravity, whereas the intracranial and especially the intracerebral air collections may lead to serious symptoms and the death of the patient.

About a hundred cases of internal pneumocephalus are on record (Lewis 1928). They have been classified as subdural, subarachnoid, intracerebral, and intraventricular, and this subdivision seems to be accepted by most writers. So far as I am aware only one instance of an epidural collection of air has been published, that of Reisinger (1918), and his description has not been accepted by several of the later reporters.

I have only recently had an opportunity of reading Reisinger's paper and I see no reason why the condition he found at operation—the dura mater lay in folds on the retracted frontal lobe—should not be described as "epidural," in part at least. There was, however, a pneumatocele of one of the frontal lobes and it has been argued that this was ruptured during the operation and that its contained air escaped into the extradural space. It is difficult to see how such a state of things could arise during the short time required to open the skull and cause so great a retraction of the brain and separation of the dura mater from the skull as was found. Moreover Reisinger definitely stated that he could not find any wound in the dura mater by which air could escape.

Personally I have not met with a pneumatocele of the brain, but in 1913 I had a patient with an extradural collection of air and I prefer to describe his as a case of epidural pneumocranium. The history of this patient was as follows.

A CASE OF EPIDURAL PNEUMOCRANIUM

A man of 21 fell from a house roof on Nov. 15th, 1913. When admitted to hospital he was unconscious but extremely restless. A lacerated wound exposed an area of bone an inch square in the left temporal fossa immediately behind the left angular process of the frontal bone. The entire surface of the wound, bone, and soft tissues was well ingrained with dirt. There was no bleeding from the ears or mouth but traces of blood could be seen at the nares. There was no other evidence of fracture. Percussion over the left temple gave a distinctly hollow note. The left pupil was wider than the right, but both reacted to light. The wound was cleaned by excising it and chiselling the bone surface, but as its cleanliness was in doubt it was left open.

His temperature on admission was 98° F.; at midnight it was 103·6° F. and his pulse-rate had risen from 64 to 140. A subconjunctival ecchymosis appeared at the left outer canthus in the evening and increased in size. He vomited a quantity of digested blood during the night. Next day he was conscious enough to reply to simple questions and swallowed without difficulty, moving his limbs rather too freely. There was no facial or ocular paralysis. He vomited more blood-containing material on two occasions and was evidently still bleeding from or through the ethmoid, the blood getting into the pharynx and being swallowed. On the 19th he was very restless, dazed, unable to speak, and had lost control of his sphincters. His temperature, which had been high, suddenly dropped but rose again at night. On the 21st he was better, talking sensibly and taking nourishment well. On the 22nd and 23rd he vomited several times with no blood in the vomit. On the 23rd his temperature fell to 98° F. at night and on the 24th he became comatose again, though still able to swallow. There had been no neck rigidity at any time. It was not possible to see the eyegrounds owing to corneal opacities. The cranial wound had suppurated, the exposed bone being white and avascular and obviously necrosing to an uncertain depth. The percussion note over it was hollow. There had been no hæmorrhage or loss of cerebro-spinal fluid from nose or ears since admission.

On the 25th his general state was unchanged. He was comatose, with a subnormal temperature and slow pulse. In the belief that there was a fracture of the ethmoid and possibly a frontal abscess, the scalp wound was enlarged and the skull trephined through the area of bone originally exposed by it. The bone was completely avascular and the opening was enlarged all round until vascularised bone was reached, leaving a gap two inches square. No fracture was met with in doing this but a remarkable condition came into view. The dura mater exposed was retracted from the skull for half an inch and lay quite slack in folds and presented a dried-up appearance. The dura was quite loose and was separated from almost the entire left half of the frontal bone. There was no blood in this space but when the loose membrane was lifted off the floor of the anterior fossa a thin layer of dried blood was seen lying on its cerebral surface.

The dura mater itself looked darker than normal as if there might be blood beneath it, so it was opened but only a small quantity of blood-stained fluid was found. The frontal lobe so exposed was seen to be retracted for half an inch from the dura and was covered by a thin layer of subarachnoid blood. This retraction of the brain was away from the whole internal aspect of the left frontal bone anteriorly and laterally. An elevator was passed down between dura and brain to the floor of the anterior and middle fossæ and back nearly as far as the parietal eminence without tapping any blood, but since a small amount of fluid had run out when the dura was first opened, it was thought well to make a counter-opening, and this was made at the posterior part of the parietal bone because the air in the subdural space would probably cause any fluid to gravitate backwards. The dura here was found to be in close contact with the bone; it had the same dark appearance as at the anterior opening and on incising it we collected an ounce and a half of dark blood-stained fluid which was later reported to be sterile. The exposed brain pulsated quite distinctly although so much shrunken, but the pulsation was certainly not expansile and might only have been communicated from the right hemisphere. There was no œdema of the soft membranes at either of the exposed areas of the brain. At this stage the patient's medullary centres failed and efforts at resuscitation were of no avail.

A post-mortem examination was claimed by the Crown authorities and my application to be present was refused. I learned afterwards that, as far as the examination of the head and brain was concerned, my findings at the operation were corroborated. The dura mater was separated from the skull as stated above, and the left hemisphere of the brain was about three-quarters of an inch from where the internal surface of the skull would have been. There was a fracture of both orbital roofs crossing the cribriform plate; the ethmoid cells contained blood clot and there was blood in both orbits. Neither the frontal nor the sphenoidal cells were involved. There was no free blood in any of the cranial fossæ and there was no sign of any reaction of the tissues. I saw the brain: both hemispheres had a very thin subarachnoid hæmorrhage over their convexity anteriorly. What was remarkable was the great diminution in size of the left hemisphere. From about the region of the post-central sulcus the left parietal, frontal, and temporo-sphenoidal lobes were much smaller than the same areas of the right hemisphere. The convolutions were narrowed, flattened, and shrunken. There was remarkably little laceration of the brain, and no hæmorrhage, collection of air, or any cavity other than the ventricles in the substance of the brain.

One may assume that air entered the skull through the ethmoidal fracture and collected extradurally, probably causing the extensive stripping of the dura from the frontal bone by its increasing tension. Some air found its way into the left subdural space, no doubt through a tear in the dura over the fractured cribriform plate, to which the dura is particularly closely attached and where it is often found to be lacerated by these fractures. At some period the air within the skull must have been under increased pressure to have produced the very complete compression of the left hemisphere that existed; the very thin subarachnoid blood layer, although widespread, could not have caused so great a shrinkage of the brain from the dura and bone.

At post-mortem examinations after skull injuries I have often seen areas of the dura separated from the bone without any blood effusion, which must

have been due to the deformation resulting from the violence applied; but I had never previously met with a widespread separation without hæmorrhage such as was seen in this patient. By the time of the operation the tension of the enclosed air had certainly diminished (no air was heard escaping when the skull was opened), no doubt by absorption, as otherwise the dura mater would still have been stretched and, as it was dried by its contact with the air, would probably have remained in that state instead of being thrown into loose folds. It is more than doubtful if any air could have escaped through the avascular bone in the floor of the original wound.

This was in reality a case of epidural combined with subdural pneumocranium. Why the pressure was so definitely unilateral I do not know, unless the falx cerebri, from close contact with the right hemisphere, prevented the passage of air to the right side. It is possible that there was air in the right subdural space and that the entire cerebrum was reduced in size, but I had no opportunity of seeing the parts in situ.

A CASE OF SUBDURAL PNEUMOCRANIUM

A lad of 17 was admitted to hospital on Nov. 29th, 1915, after an injury by a train. He was quite conscious and able to move his limbs. He was bleeding profusely from the right auditory meatus but had not bled from the nares or mouth. The pupils were equal and rather wide but reacted to light. There was a hæmatoma in the right temporal fossa extending up above the auricle, and beneath it a considerable area of depressed bone could be felt. A lacerated wound across the right suboccipital region, well ingrained with dirt, had sheared the muscles off the bone down to the posterior atlanto-occipital membrane and dragged out the greater occipital nerve for almost its entire length. The percussion note over the right temporal region was definitely hollow.

I assumed that the extremely free hæmorrhage from the ear indicated some increased intracranial pressure, and trephined over the right meningeal artery to enable the depressed bone to be elevated. The bone broke off in doing this, producing a fairly large opening. A considerable extradural clot was exposed and removed; the main branches of the meningeal artery had not been injured. When the dura mater was freed from the pressure of the clot it bulged up to the level of the opening in the skull and presented an appearance that was entirely new to me. There was a large amount of fluid blood in the subdural space and floating on its surface were numerous air bells, a few as large as a florin and many small ones, and among them several small ovoid ivory-like bodies. These and the air bells could be moved about freely upon the blood under the dura. When the dura mater was incised at the lowest and most posterior part exposed, the blood escaped freely along with the air and the ivory bodies, which were fragments of brain tissue. The inference was that air had gained entrance into the subdural space through a fracture involving the right tympanic cavity and the overlying dura mater, as there was no evidence of fracture of the frontal or other sinus. As it seemed probable that infection would follow, the bone taken out was not reimplanted, and the scalp wound was loosely closed. The occipital wound was excised as well as possible and the ingrained surface of bone chiselled off; the great occipital nerve was cut short and this wound, which also had all the appearance of being infected, was only loosely sutured. The patient, however, made a perfect recovery. Hæmorrhage from the meatus ceased at once. No stain came into the dressings, there was no loss of cerebro-spinal fluid, and the two wounds healed aseptically.

Six weeks later, on Jan. 11th, a flap was turned down over the defect in the right temporal bone, a celluloid plate was accurately fitted into the opening, and the flap was close sutured. Primary union followed and the patient went out well on Feb. 8th. The optic discs remained normal throughout. The patient was seen at intervals and remained well, free from any cerebral signs or symptoms beyond a zone of occipital anæsthesia. In October, 1917, we heard from his home that he had been called up to join the army in June of that year and had been already three weeks in France. A little later we heard he had been killed in action.

This patient did not develop cerebral compression from the intracranial hæmorrhage and air first, because of the free escape of blood from the ear, and secondly, because as the result of the operation the intracranial hæmorrhage ceased and the consequent relief of tension allowed the brain to expand again. Without timely operation the condition might well have become much more serious and, had infection been superadded, would certainly have been fatal.

In similar cases succussion sounds in the mixture of air, blood, and cerebro-spinal or reaction fluid have sometimes been heard both by the examiner and the patient, and might well have been heard in this last patient had they been listened for. Radiological examination has also been a definite help in establishing the diagnosis in uncertain cases. These test methods were not employed in either of the present cases because until the operations were in progress nothing had arisen to suggest the presence of air within the skull.

SUMMARY

In pneumocranium air enters the cranial cavity usually as the result of a fracture of one of the cranial air sinuses. In one of the two cases here described the air was mainly extradural and in the other it was subdural. On percussion of the skull a hollow note is obtained over the collection of air but a certain diagnosis can only be made by radiography. The diagnosis will often be missed unless the condition is kept in mind.

REFERENCES

Lewis, A. J. (1928) *Brain*, **51**, 221.
Reisinger (1918) *Beitr. klin. Chir.* **119**, 129.

Clinical and Laboratory Notes

LUMBAR THROMBOPHLEBITIS

A COMPLICATION OF RETROCÆCAL APPENDICITIS AND OTHER PELVIC INFLAMMATIONS

BY EMIL ALTSCHÜLER, M.D. Strasbourg

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ANY severe inflammation in the vicinity of the ilium, whether intra- or retro-peritoneal, may lead to thrombophlebitis of the iliolumbar veins if it is accompanied by pus formation. The complication is especially common after retrocæcal appendicitis and inflammations of the female internal genitalia.

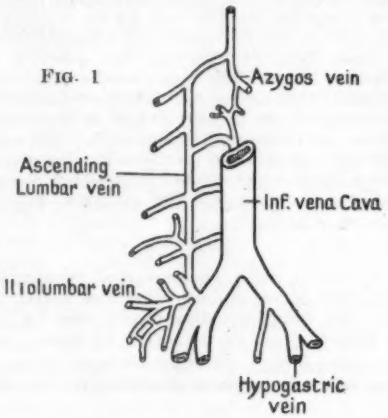
ANATOMY

The blood from the soft parts covering the ilium collects in front of the psoas muscle and is carried into the ascending lumbar group of veins. This is a small retroperitoneal venous system into which the iliolumbar as well as the vertebral veins empty. The left and right lumbar veins are connected with it by way of the vertebral veins; the hypogastric vein by way of the iliolumbar vein (see Fig. 1). Above the diaphragm the ascending lumbar veins continue as the azygos and hemiazygos veins.

The thrombophlebitis occurs in the iliolumbar veins, and spreads to the ascending lumbar group.

I can recall at least a dozen of these cases from my practice in Frankfort. During my experience as consultant, I was impressed with the fact that many

FIG. 1



surgeons and gynæcologists were not familiar with this condition, and serious diagnostic and therapeutic mistakes were made. Cases were incorrectly diagnosed as intra-abdominal abscess, peritonitis, subphrenic abscess, and operated upon accordingly.

CASE REPORT

The records of my former clinical practice are not available, but I wish to describe a typical case of lumbar thrombophlebitis that I have had occasion to see in Tel-Aviv.

On Nov. 21st, 1935, I operated on a young woman aged 28, unmarried, for dermoid cyst of the right ovary with twisted pedicle. The wall of the cyst was already partly gangrenous. There were fibrin floccules around the cyst, which was attached to the posterior pelvic peritoneum. There was cloudy serous exudate in the abdominal cavity. The post-operative course was entirely normal at first without the slightest complication.

She got out of bed on the 11th day after operation. On the 13th day she felt ill, with slight pain in the left upper abdomen and nausea; the mouth temperature arose to 101·2° F. The following days there was severe meteorism with elevation of the diaphragm, particularly on the right side. The leucocyte count rose to 20,000; Arneth count considerably displaced to the left. The temperature remained elevated with a much higher rise on the 17th and 19th days, each time accompanied by leucocytosis, by nausea, and once by vomiting. The severe meteorism remained stationary. On the 23rd day the temperature fell and convalescence began (see Fig. 2). In spite of the severe meteorism, the bowels moved freely throughout the illness. Mild pains were present all the time, sometimes in the left upper abdomen, sometimes in the right upper abdomen, and sometimes in the right side.

Examination revealed slight œdema of the skin in the right upper lumbar region. There was never muscle spasm, merely slight tenderness on deep pressure over the painful areas. As if to confirm the diagnosis, there were two small emboli in the lungs towards the end of the febrile period. There were never signs of thrombophlebitis of the lower extremities—neither during the course of the illness nor after discharge from the hospital did getting out of bed cause œdema of the legs.

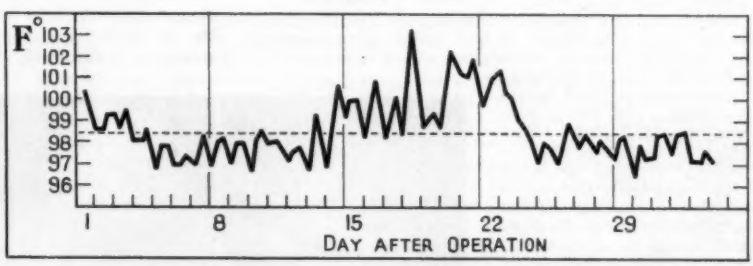
COMMENTS

The complication does not always run such a mild course as this. I have seen a number of cases with repeated rigors. In one case there was pus and abscess formation around the affected vein in the retroperitoneal space. Incision gave not only pus, but also copious venous bleeding which could be stopped only by tampon.

It may be that it is difficult, or even impossible, to make a definite diagnosis during the first few days, particularly in those cases that begin with severe acute symptoms. The position usually becomes clearer after a few days. There remains a general feeling of well-being; there is absolutely no reflex muscle spasm; bowel activity remains normal in spite of severe meteorism. The pains vary, now on the right side, now on the left, once in the upper abdomen, and then a few days later again in the lower abdomen, or on the side or in the back. There is often slight œdema of the skin laterally on both sides. The main difficulty at the onset of the illness is to differentiate between ileocolic thrombophlebitis and appendicitis with pus formation. But ileocolic thrombophlebitis, not operated on, with fatal spread to the portal vein in most cases, often sets in at the onset of the appendicitis with a rigor at the start or shortly after. It must be recognised at operation and treated by ligature of the ileocolic vein. In contradistinction to thrombophlebitis of the ileocolic vein, thrombophlebitis of the iliolumbar vein or lumbar thrombophlebitis does not set in until several days post-operatively or after onset of the illness.

Of particular importance is the fact that the prognosis in almost all cases of lumbar thrombophlebitis is favourable. I have not seen a single fatality even in the most severe cases with repeated rigors over a period of 3–4 weeks. In severe infections one must always be on the look-out for the breaking-down of a vein with retroperitoneal abscess formation. I once saw such a case, which was completely cured after incision and tamponing of the bleeding vein.

FIG. 2



SUMMARY

Lumbar thrombophlebitis is a definite clinical entity of diagnostic and prognostic importance. Because of the favourable prognosis active treatment is not necessary except in cases of abscess formation. Perfect rest, regulation of the diet and of the bowels are the essential therapeutic measures.

CASE OF PNEUMOCOCCAL MENINGITIS TREATED WITH M. & B. 693

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A CASE of pneumococcal meningitis, very similar to that recorded by Dr. G. C. K. Reid in THE LANCET of Sept. 10th (p. 619), appears to have recovered in the Hampshire County Hospital after treatment on the same lines with M. & B. 693. The importance of these cases is unquestionable, and must go far to stamp this new preparation as effective.[1]

A boy of 14 was admitted to hospital in the evening of August 21st. He had been ill for two days with headache, vomiting, and fever, and latterly had developed a gross squint. On admission his temperature was 102° F. and his pulse-rate 124. He was unconscious and showed all the signs of a severe meningitis, together with what appeared to be a complete paralysis of the right external rectus. Lumbar puncture revealed a frankly purulent fluid under marked tension. Direct smears made from this pus were found to be swarming with morphological pneumococci. This finding was confirmed by culture next day.

FINDINGS IN THE CEREBRO-SPINAL FLUID

Date.	Appearance.	Cells.	Protein (per cent.).	Chlorides (per cent.).	Culture.
Aug. 22	Turbid.	99 per cent. polymorphs.	0·25	0·64	Pneumococci.
„ 23	Turbid.	99 per cent. polymorphs.	0·24	0·60	Sterile.
„ 24	Less turbid.	90 per cent. polymorphs.	0·10	0·66	Sterile.
„ 31	Clear.	40 cells per c.mm.	0·05	0·65	Sterile.
Sept. 5	Clear.	54 cells per c.mm.	0·04	0·709	Sterile.
Sept. 12	Clear.	7 cells per c.mm.	0·03	0·71	Sterile.

M. & B. 693 was not immediately available, and soon after admission 40,000 units of polyvalent (I and II) Felton's serum was given intrathecally, while 20 c.cm. of Soluseptasine was injected intravenously. The latter dose was repeated eight hours later by intramuscular injection. Next morning there was little change in the boy's condition. The administration of M. & B. 693 was now commenced, 2 grammes (4 tablets) being given four-hourly during the first 24 hours. The dose was reduced to 1·5 g. four-hourly on the second day, and to 1·0 g. four-hourly on the third day. The patient's condition appeared to improve almost immediately and his temperature was normal within 24 hours of taking the first dose. On the fifth day after admission, by which time the dosage had been dropped to 0·5 g. four-hourly, the temperature started to rise again, and reached 100° F. on the sixth day. It fell rapidly immediately the dose was increased. There has been no further noteworthy rise of temperature. Within 48 hours of the first dose of M. & B. 693 the boy was able to take light food and, though disturbed by diplopia, was able to read. He had lost his headache and complained of nothing. He was allowed up at the end of ten days but was kept in hospital so that his cerebro-spinal fluid could be studied (see Table). He was discharged within four weeks from the onset of his illness, symptomless, and with no physical signs.

No local focus of infection was detected in the boy's ears or lungs, while throat swabs failed to reveal the presence of pneumococci. One unexplained feature, which appeared on the third day of treatment and lasted two days, was a brisk hæmaturia. The urine was packed with red cells but no other abnormal elements were detected. The bleeding subsided completely within 48 hours. Possibly this should be regarded as a toxic effect of the drug.

SUMMARY

A boy of 14 with pneumococcal meningitis was treated with M. & B. 693 from the fourth day of illness. His symptoms disappeared and his cerebro-spinal fluid became sterile within 48 hours.

My thanks are due to Dr. Charles Wrigley, pathologist to the hospital, and to my house physician, Dr. C. W. C. Gough.

[1] A child of 8 years with pneumococcal meningitis now being treated at the Royal Hampshire County Hospital has also shown an immediate response to M. & B. 693.

NEW INVENTIONS

ENDOVESICAL PHOTOGRAPHY

FOR many years I have been considering the construction of an appliance by means of which photographs could be taken of the interior of the bladder. With my collaboration the technical details have been worked out by Hans Kollmorgen, who designed the new photographic eye-piece of the cystoscope which is to be used in connexion with Dr. A. Gullbring's camera for thoracoscopy, and the complete instrument (Fig. 1) can now be obtained from Kirurgiska Instrument Fabriks Aktiebolaget ("Kifa"), Stockholm. Fig. 2 shows three endovesical photographs taken with this instrument. Photographs in colour can also be taken without difficulty.

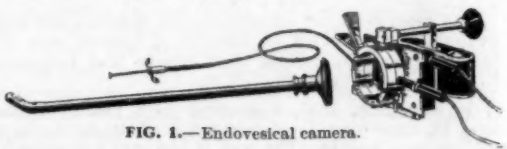
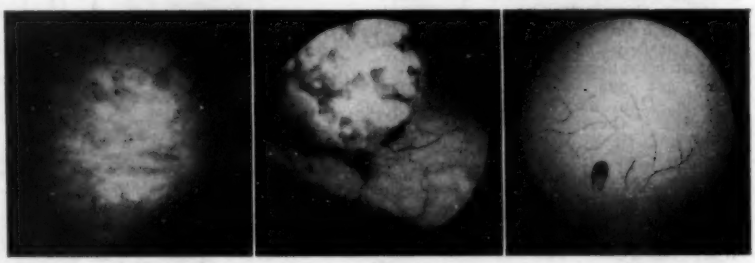


FIG. 1.—Endovesical camera.



(a) (b) (c)

FIG. 2.—(a) Ureteric orifice in a case of cystitis. (b) Part of a papilloma of the bladder. (c) Ureteric orifice, taken on a vesical phantom.

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REVIEWS AND NOTICES OF BOOKS

The History of Bacteriology

University of London, Heath Clark Lectures, 1936. By WILLIAM BULLOCH, M.D., F.R.S., Emeritus Professor of Bacteriology in the University of London. London: Humphrey Milford, Oxford University Press. 1938. Pp. 422. 10*s.* 6*d.*

THE appearance of a history of bacteriology by Prof. William Bulloch will give more than ordinary pleasure since it has long been recognised that no other living scholar has a comparable knowledge of the subject. The author's admirable chapters in the Medical Research Council's System of Bacteriology and his obituary notices of great bacteriologists form a lion's share of the authentic bacteriological history written in our time. It is, indeed, as he remarks, a curious fact that in spite of the vast and vigorous growth of almost every branch of this subject so little should have been written on its history. If we exclude Prof. Bulloch's own contributions we have to go back to Friedrich Loeffler's "Vorlesungen" published in 1887 before we find a systematic history of the science based on first-hand knowledge. Loeffler's book, which was only too brief, is invaluable because it records at close quarters so much of the work of the formative period of bacteriology; it is now, unfortunately, difficult to obtain and the possibility of reprinting it might well engage the attention of publishers interested in the scientific classics. The learned Prof. Bulloch lived and worked through the dramatic bacteriological period which followed that dealt with by Loeffler. He knew intimately most of the great figures of nineteenth-century bacteriology and, as his friends are well aware, is possessed of a fund of personal records and anecdotes about them. But if he is the acknowledged master of the bacteriological "conte drolatique" there is little sign of it in this scholarly and critical little volume. Only here and there in a pithy "aside" or in the quick turn of a phrase does the author's characteristic humour peep out and serve to give piquancy to his otherwise sober story.

The book is divided into eleven chapters, ranging from ancient doctrines on contagion to theories of immunity. The account of technique, so vital a matter in the history of an experimental science, is lucid and full. The famous names of bacteriology are assessed independently and with justice. Ehrlich, in particular, is given high praise as "the greatest scientific writer in medicine in the last fifty years." Prof. Bulloch seems to have sensed that the immediate reaction of his fellow bacteriologists to his all too short narrative will be to ask for more, and he has added a very full bibliography and brief biographical notices of nearly 350 bacteriologists. These features make the book invaluable as a guide to future research into bacteriological history and should do much to direct study to a neglected subject. We earnestly hope that Prof. Bulloch himself will find time and opportunity to give us further samples from the treasure house of his learning.

Säuglingskrankheiten

Fourth edition. By Prof. Dr. H. FINKELSTEIN. Amsterdam: "Elsevier." 1938. Pp. 890. 70*s.*

Prof. Finkelstein's teaching is known to so many English graduates that his book should require little introduction. This edition follows the general scheme of earlier ones though it has been extensively revised. It is divided into six sections, dealing with the development and nutrition of infancy, the neonatal period, general disturbances of body structure, metabolic diseases, infectious diseases, and diseases of single organs. While this arrangement involves some overlapping, it enables the reader to find what he wants very easily. As might be expected, the section devoted to infant nutrition is outstanding and summarises German views very clearly. The book is profusely illustrated, perhaps even overburdened with charts. References are given in footnotes.

This edition, which in many ways is a model of medical book production, has been published in Holland. The variation of type is judicious and the introduction of coloured illustrations into the text is unusually successful.

Surgical Errors and Safeguards

Third edition. By MAX THOREK, M.D., K.L.H. (France), K.C.I., Professor of Clinical Surgery, Cook County Graduate School of Medicine; Surgeon-in-Chief, American Hospital of Chicago. London: J. B. Lippincott Co. 1937. Pp. 696. 45*s.*

EXPERIENCE is the name we give to our mistakes, and it is natural to hope that others might learn from *our* errors, instead of having to make the same mistakes again for their own edification. It often happens however that medical men who, with a laudable lack of self-interest, have published their failures for the benefit of their colleagues are not successful in conveying the proper warning. It seems likely that our mistakes, like much else of our personal property, are not of much value to anyone else. We would wonder whether other surgeons are likely to obtain any real help from the errors recorded in this book if it did not carry fine testimony to its usefulness in its appearance in a third edition within three years of the second.

Some sections are certainly good—for example, the chapter on the pitfalls in cholecystectomy. A list of 35 conditions which may under certain circumstances resemble appendicitis is more of a hindrance than a help; and surely the diagnosis of carcinoma of the breast is not always so obscure as to justify the rule that *no* woman should be subjected to radical mastectomy without pre-operative biopsy. Much of the advice would be appropriate only to surgeons whose standards of intellect, training, and practice are unusually low—for instance, "It is a technical error not to have a complete neurological examination of the patient made before undertaking an operation on the brain"; "An exploratory laparotomy should never be undertaken unless the physical examination has given clear evidence of an abdominal lesion"; and "Congenital dislocation of the hip must not be overlooked. It will not help the physician in his professional standing in his own community if he fails to discover it." Remarks of this kind are plentiful, and though they may entertain students in a lecture room they are out of place in a serious book. The anecdotal style leaves a disagreeable impression, especially when an important subject, such as the safeguards before and after surgical operations, is suddenly dropped to give place to some trivial quip. The main basis of the arrangement is according to regions of the body, but it is rather haphazard and no attempt has been made to separate off pathological processes. Thus congenital malformations may appear in a paragraph headed malignant disease, and injuries of muscle crop up in the middle of an account of arterial ligations. The book is illustrated by photographs of

patients and pathological specimens, and several coloured plates are reproduced from Davis's Applied Anatomy.

A Guide to Human Parasitology

Third edition. By D. B. BLACKLOCK, M.D. Edin., D.P.H. Lond., D.T.M. Liverp., Professor of Tropical Hygiene, Liverpool School of Tropical Medicine; and T. SOUTHWELL, D.Sc., Ph.D., F.R.S.E., Walter Myers Lecturer in Parasitology in the School. London: H. K. Lewis and Co. 1938. Pp. 259. 12*s*. 6*d*.

THIS elementary text-book provides a fascinating introduction to an important subject. The authors have managed not only to crystallise the essential facts known about human parasitology but to present them in such a way that the underlying general principles of medical zoology are brought out. At the same time the book provides a useful guide for practical workers. The more important parasites of man are described carefully but without an overwhelming burden of detail or theory; and the methods of diagnosis given are not too elaborate for the use of doctors who have to deal with the diseases produced by such parasites. The diagrammatic summaries and tables are helpful. A student who has mastered the information here supplied and has had a course of practical work in parasitology will have acquired a firm foundation from which to develop his knowledge. The book is of handy form, clearly printed and well bound, free from serious typographical errors, and furnished with a good index.

Synopsis of the Diagnosis of the Acute Surgical Diseases of the Abdomen

By JOHN A. HARDY, B.Sc., M.D., F.A.C.S., El Paso, Texas. London: Henry Kimpton. 1938. Pp. 345. 20*s*.

THIS book is written for those general practitioners who, living at a distance from a large surgical centre, are compelled to deal with their own surgical emergencies. Since, as Dr. Hardy points out, it is often essential to arrive at an early diagnosis if catastrophe is to be avoided, he has presented vivid clinical accounts of acute abdominal disease with this end in view. The only fault we can find with these accounts is that they are so comprehensive that the reader may be led to expect more than is very often present in the way of physical signs and symptoms, and may therefore fail to distinguish the essentials upon which emphasis should be particularly laid. The practitioner who brings to its study common sense and the fruits of his own experience is not likely to be misled. The book is easy to consult and reliable. There is a slight error on page 327 where the artist has labelled as ileocolic an ileocæcal intussusception.

Life, Heat, and Altitude

By DAVID BRUCE DILL, Fatigue Laboratory, Harvard University. London: Humphrey Milford, Oxford University Press. 1938. Pp. 211. 10*s*. 6*d*.

THE work of the Harvard Fatigue Laboratory is justly famous the world over, and is probably as closely followed in Great Britain as it is in the United States. Its numerous and usually highly technical publications are for the most part to be found in the American journals, and, although these are accessible in this country, it is only possible for the experts in this branch of applied physiology to follow them in detail. This account of some of the latest researches, compiled in a form acceptable to those who are not specialists, is one of the most attractive and instructive books on any aspect of physiology that we have seen for some time. The relations that have been worked out between energy exchange and environment, perspiration, and thirst, and the application of this knowledge to the study of life in hot climates, wet and dry, to animal life and human life and performance in deserts and at high altitudes, and to problems of high flying form a most interesting and convincing story. This study in human physiology is commended to workers in undertaking any form of clinical research not only for its content but as an instance of how much can be gained by the coöperation of a highly trained team.

The Compleat Pediatrician

Practical, Diagnostic, Therapeutic, and Preventive Pediatrics. Second edition. By WILBURT C. DAVISON, M.A., D.Sc., M.D., Professor of Pediatrics, Duke University School of Medicine, and Pediatrician, Duke Hospital. London: Cambridge University Press. 1938. 250 sections. 18*s*.

THIS book reminds us of the man who spent his life trying to squeeze the River Jordan into a jam-jar. The result does not justify the effort, and if the equipment of the "compleat pediatrician" of the future is to be reduced to something between a telephone directory and a book of log tables, he will cut a sorry figure when confronted with a sick child. Admittedly in the second edition the author is less sparing of the text than in the first, and he has considerably reduced the number of sections so that on occasion a whole page or even more is devoted to one disease. But it is not enough. Of Prof. Davison's knowledge of pædiatrics there can be no question, and he has summarised a vast amount of recent work. To the weary lecturer who wants to make sure that he has covered the ground this book will prove valuable once the system of reference and cross-reference has been mastered; but a student who relies on it for instruction will certainly fail to grasp either the principles or practice of this important branch of medicine.

Common Happenings in Childhood

By Sir G. FREDERIC STILL, K.C.V.O., M.A., M.D. Camb., Hon. LL.D. Edin., F.R.C.P., Physician Extraordinary to H.M. The King; Consulting Physician for Diseases of Children, King's College Hospital, and to the Hospital for Sick Children, Great Ormond-street. London: Humphrey Milford, Oxford University Press. 1938. Pp. 180. 5*s*.

CRYING, laughter, temper, tiredness, appetite, fears, sleep, and school are the subjects of these eight short discursive essays about children. As might be expected, they abound in clinical wisdom and display the author's close sympathy and familiarity with children in health and disease. The reader may well feel that so skilled and patient an observer of the young human animal deserves the title of naturalist no less than that of clinician. Humbly, perhaps with tongue in cheek, Sir Frederic disclaims all pretensions to being a psychologist, but his book belies him, notably in the chapters on fears and school. His views, based on a vast experience, tally strikingly with the best modern psychological conceptions of how children should be handled. There is nothing commonplace or dull in this book which is commended not only to doctors but to all concerned with the young.

THE LANCET

LONDON: SATURDAY, SEPTEMBER 24, 1938

BABIES WHO DO NOT BREATHE

YEAR by year the Registrar-General's tables attribute 1000 deaths or more under one year of age to atelectasis. Substantially this must refer to newly born infants who have not breathed vigorously enough to survive. In a recent article[1] FLAGG ascribes to the same cause 60 per cent. of *all* the deaths registered in New York City under the heading asphyxia, and he states (rather surprisingly) that according to an inquiry initiated by Dr. ALEXIS CARREL some years ago the total of such deaths in New York City exceeded 50,000 a year. It was the effect on his mind of these appalling figures that led FLAGG to make his plea for better treatment of what the obstetrician calls asphyxia neonatorum, and the Registrar-General calls atelectasis, but which might preferably be known as respiratory failure in the new-born. Eleven years ago he described a method of direct laryngoscopy, aspiration and positive pressure insufflation after intubation under direct vision. Since that time the apparatus has been improved and numerous pupils have been instructed in its use. Extended experience has confirmed FLAGG'S opinion of its value and also convinced him that there is widespread ignorance of the causation of asphyxia neonatorum, which contributes (like artificial respiration) to maintaining the neonatal mortality- and stillbirth-rates.

Recent research indicates that while the child is still in the uterus respiratory movements of a feeble and primitive nature keep the airways patent; amniotic fluid gently bathes the mouth, pharynx, and trachea, while oxygenation is, of course, accomplished without the aid of the pulmonary epithelium. During delivery the bulk of this fluid will probably be squeezed out of the mouth and nostrils as the chest is compressed by the uterus after the head is born. If the baby is vigorous, with good muscle tone and active reflexes, and is not under the influence of an anæsthetic administered to the mother, any residual obstruction is overcome and respiration begins. If on the other hand the baby presents profound relaxation, obstruction, and respiratory depression, active steps must be taken if life is to be saved. The factor common to all states of respiratory failure appears to be obstruction of the respiratory passages by amniotic fluid and other debris. Hence the plea by BLAIKLEY and GIBBERD[2] that every baby should be placed with its head lower than the rest of the body so as to facilitate drainage and keep the lower respiratory tract clear until the laryngeal and cough reflexes are well established. This procedure, together with adequate toilet of the nasopharynx, will suffice for a large number of asphyxiated babies; but, as FLAGG insists, this is not enough. A substantial proportion still die because the logical consequences of accepting the foregoing explanation of asphyxia neonatorum are not followed. Direct laryngoscopy allows of thorough inspection, and the act of lifting the tongue out of the field and removing detritus provides adequate immediate treatment for the new-born infant. Active opposition to any further steps, as shown by movement of the head, swallowing reflexes, and spasm of the glottis, obviates the need for intubation. But if the pharyngeal reflex is absent and the cords inactive it will be necessary to introduce a suction tube so as to carry out intratracheal suction, and after reintubation to introduce an O_2-CO_2 mixture, which can be given until vigorous respiration is established, perhaps some hours later.

The apparatus described is not particularly elaborate, and a little practice on the cadaver should quickly give obstetricians (or their anæsthetists, who are probably more experienced with intratracheal manipulations) the confidence required for following FLAGG'S programme.

[1] Flagg, P. J., *Surg. Gynec. Obstet.* August, 1938, p. 153.
[2] Blaikley, J. B., and Gibberd, G. F., *Lancet*, 1935, **1**, 736.

REX *v.* BOURNE AGAIN

THE *Law Journal* has lately published (in its weekly issues of Sept. 3rd and 10th) two judicious and important articles reviewing the law of criminal abortion in the light of the proceedings in Rex *v.* Bourne. The distinguished author is Mr. ROLAND BURROWS, K.C., recorder of Cambridge. In discussing the possible amendment of the law and the difficult position of the medical profession, he naturally puts forward the representative legal view of the problem. "Social reasons" are irrelevant; considerations of the care and cure of the patient are far from being conclusive; surgeons must obey the law although they are at liberty to use their best endeavours, outside the practice of their profession, to secure its reform. The trouble is that the case of Rex *v.* Bourne has left the legal problem unsolved. Mr. BURROWS describes Mr. Justice MACNAGHTEN'S direction to the jury as not an absolutely binding authority but something to be treated with great respect and not to be departed from without anxious consideration. The judge, he observes, ruled that the purpose of saving the mother's life was the sole reason which could be adduced under the Offences against the Person Act of 1861 in order to show that the act causing the abortion was not done unlawfully. The result is that if the medical practitioner, directing his mind merely to the problem within his province as a medical man—i.e., the proper treatment for the care and cure of his patient—terminates a pregnancy for that purpose and not for the purpose of saving the mother's life, or at least not for the purpose only of saving the mother's life, he commits a criminal offence. The judge, Mr. BURROWS adds, seems to have left open the question whether "for the purpose of saving the mother's life" means saving her from a death which is inevitable and immediate if the operation is not performed, or whether the words

can have a wider meaning. This question, he says, has yet to come before the courts for authoritative decision as a definite issue. Meanwhile the puzzled layman can recall certain judicial dicta in the Bourne case which drew no clear line between maladies dangerous to life and maladies dangerous to health. It could not be a crime, we were given to understand, for the surgeon to operate to prevent the girl being "turned into a physical and mental wreck." Not for the first time perhaps the law is being severe in principle and lenient in practice.

The legal view of the correct attitude of the medical practitioner is of special interest. Mr. BURROWS will not allow the doctor's duties to be determined by purely social considerations. Doctors, he says, must inform themselves of the circumstances which have resulted in the condition of the patient so far as is reasonably necessary in order that she may be treated in a proper and adequate manner. To make further inquiries for any other purpose would be either idle curiosity or sheer impertinence on the doctor's part. It would not, for instance, be the doctor's concern to predetermine the fact of rape; "many pregnant women seek to cover their folly by asseverations of force or fraud"; a woman's relatives, anxious to avoid unpleasant scandal, will be prone to believe her story. Mr. BURROWS concedes that doctors may have to base their treatment upon hearsay; it may be the only way. But he maintains that it is putting an unfair burden upon doctors if they are to come to an irrevocable decision on a serious issue on the strength of ex-parte and possibly biased or hearsay statements. Nor would this be just to the person accused or suspected of violence. In any event the doctor is not equipped for deciding these questions of fact. We must expect to find that the official legal view claims for the courts a monopoly of the function of sifting evidence. It seems doubtful, however, whether Mr. BURROWS in his well-reasoned exposition takes sufficient account of the peculiarly personal relationship between a medical attendant and his patient. Barrister and lay client are by no means in the same direct contact. The barrister looks dispassionately at statements and, having to present a possible case in court, forms the habit of asking himself what is to be said on the other side. The solicitor may be better able to appreciate the fact that the doctor has to gain his patient's confidence and that scepticism may not assist the process. It may be as important to know what the patient thinks are the facts as to know what the actual facts are.

Mr. BURROWS evidently entertains a doubt whether the existing law suffices for modern needs. He insists that the medical profession is entitled to know what may lawfully be done when the health of a pregnant woman is at stake. But he is not prepared to accept as a sole test the question whether the woman's health would benefit by the termination of her pregnancy. This, he thinks, would be capable of too lax an interpretation. If the law is to be altered, he offers three suggestions. First, he considers that the purpose of saving the mother's life is too narrow a rule, particularly in the earlier stages of pregnancy. Secondly, he thinks it reasonable that the cases in which abortion may be performed for therapeutic reasons should be defined by Act of Parliament, provided that the definition is instituted for the purpose of throwing light on obscurities rather than of enlarging the powers of the medical profession. Lastly, he regards additional safeguards as essential; if it is impracticable to set up any form of judicial tribunal or to introduce a system of licensing either in general terms or for particular cases, at any rate it would not be difficult to insist upon a second opinion and upon some kind of notification. Doctors, he remarks in conclusion, may think that the law is based upon erroneous ideas. But they must obey even if they dislike it. However excellent this advice may be, it seems to ignore the history of law reform. Many an obsolete or too rigid enactment has ultimately been repealed because public opinion, in the form of the jury's verdict, was impatient of the existing law or because in some prominent case the punishment of a particular defendant was felt to be wrong. There is one point with which Mr. BURROWS in his admirable articles does not specifically deal. While the law of criminal abortion has remained unchanged, Parliament has been enacting many provisions for the welfare, health, and safety of the young. If the existing law really compels a young girl to bear a child when the pregnancy is judicially proved to have been due to rape, it is ridiculously inconsistent with the spirit of modern legislation. Difficult as it may be to assess the psychological values concerned, we cannot believe that public opinion feels satisfied that the girl-mother should be sentenced to this lifelong reminder of the violence of which she was a victim.

SULPHANILAMIDE AND THE LEUCOCYTES

No effective therapeutic agent is free of danger. Already in its short but brilliant history sulphanilamide has produced a myeloid aplasia resulting in an agranulocytosis which has proved fatal. The recorded cases of this disastrous complication are very few and we may reasonably conclude that, except where medication has been unduly prolonged, idiosyncrasy is responsible for them. It is however pertinent to inquire whether the production of leucocytes is affected in any degree by therapeutic doses of the drug. Such studies as have hitherto been directed to this question have suggested that sulphanilamide has little if any effect on the leucocytes; it appears neither to stimulate nor to depress either their formation or their activity. According to the observations recorded by C. J. C. BRITTON and J. HOWKINS on p. 718, this view will have to be modified. They have made regular leucocyte counts on fifty ambulant patients to whom sulphanilamide was being administered in moderate doses; a graph plotted from an average of these counts shows a distinct fall in the polynuclears, the count reverting to normal after the drug was stopped. It may be

asked: is this a minor degree of the toxic effect shown in total agranulocytosis? That the bone-marrow should be so vulnerable to the drug, even in slight degree, seems to bring the danger of severe aplasia nearer, although the fact remains that such a result is mercifully rare. These patients were given only 1·5 g. daily—it would be interesting to know whether larger doses would have a more pronounced effect. They were ambulant and the fact of having led ordinary lives during the treatment may have contributed to the result. Studies of in-patients would not be strictly comparable if rest in bed is a substantial factor in favour of the bone-marrow, but they would carry the certainty that the drug is taken; out-patients who have once experienced the depression caused by sulphanilamide cannot be depended on to go on taking it. It is perhaps doubtful whether at this stage of our knowledge the ambulant patient is quite a satisfactory subject for sulphanilamide treatment; he may relinquish it, or he may develop toxic manifestations while not under observation. The most serious danger of course lies in self-medication, especially when anxiety to be cured quickly—for example, of gonorrhœa—is an incentive to overdosage. There seems to have been more of this abuse in the United States and in Germany than here, but it is nevertheless a relief that the Home Office, in response to representations extending over more than a year, has decided to restrict the sale of sulphanilamide and all preparations containing it.

ANNOTATIONS

A NEUROLYTIC VIRUS FROM TOXOPLASMA-INFECTED TISSUE

THE story of the discovery in the brains of mice infected with toxoplasma of a hitherto unknown filtrable agent is rather curious. Dr. A. B. Sabin[1] had been working with toxoplasma maintained in mice by intracerebral passage and at no time had it been possible, either by centrifugation or filtration, to demonstrate in the brains of these mice the presence of an infective agent other than the toxoplasma. After they had been carried through some fifty generations of mice an attempt was made to preserve the toxoplasma by freezing the brain tissue at −80° C. The attempt was unavailing, as the toxoplasma were invariably killed at this temperature, but the treatment had the unexpected result of "producing," liberating, or unmasking a new agent capable of producing disease in mice. This agent was sought in vain in normal mice, but has been recovered from 7 out of 9 strains of toxoplasma which were being passed in mice. It has many of the characters of a virus. It is resistant to 50 per cent. glycerol and to drying and it keeps for months when frozen at −80° C. It is filtrable through a Berkefeld V candle and is somewhere between 314 and 360 mμ in size. Sabin was not able to cultivate it on various artificial media and it is killed by 15 minutes' heating at 42°–45° C., a rather lower temperature than is required to kill animal viruses. It can be maintained in mice by intracerebral passage and one strain has now been carried to the thirtieth generation. Mice so inoculated develop symptoms of infection in 1 to 10 days, the majority recovering in a few days; only a small proportion die. The characteristic symptom is a turning of the body on its long axis, and histological examination of the brain shows that this is due to an acute necrotic lesion of the caudal pole of the cerebellum. There is also some destruction of brain tissue around the lateral ventricles and in all these lesions both myelin and axis-cylinders are destroyed with the liberation of free fat. Intraperitoneal and intrathoracic injections also give rise to infection, and most of the mice receiving large doses of the agent by these routes die in 1 to 3 days with nervous symptoms and convulsions. Lesions consisting of extensive vacuolation and degeneration of the neurons in cortex, basal ganglia, and cerebellum are demonstrable but no virus is recoverable from the brain, though it is present in other viscera such as liver, spleen, kidney, adrenals, and lungs.

These are the main features of this new virus whose chief interest lies in its origin. Does this agent lie dormant in the brains of normal mouse stocks, becoming virulent when the mouse brain is infected with toxoplasma? And if so, what is its relation to these parasites? Does it invade them and then multiply? If not, why can it not be separated from them by filtration and centrifugation? Sabin arouses speculation by mentioning other means than freezing for liberating this agent but does not specify them. This is only one of the many questions arising out of this interesting discovery, of which the developments will be eagerly watched.

[1] *Science*, August 26th, 1938, p. 189.

GASTRIC DISORDER IN TRANSPORT WORKERS

THE sickness experience of London transport workers, with special reference to digestive disturbances, was examined last year for the Industrial Health Research Board by Mr. A. Bradford Hill, Ph.D., who found that over a period of years there was some excess of gastric illnesses amongst omnibus workers as compared with tramway workers in similar age-groups.[1] The question has since been further considered by a conference held at the instance of the Minister of Labour between representatives from the Medical Research Council, the London Passenger Transport Board, and the Transport and General Workers' Union. A series of discussions have been held, as the result of which an interim report has been presented to the Minister. After considering the hours and conditions of work of both omnibus and tramway operatives, and all the information obtainable about the incidence of gastric illness, the conference have been unable to do more than confirm the conclusions reached in Dr. Hill's report. They have had to dismiss as impracticable any attempt at extracting from hospital statistics more reliable information on incidence of gastric disease in any one occupational group such as transport workers. The sickness experience of the Metropolitan Police is being examined, but their age-distribution and conditions of service differ so widely from those of transport workers that the chances of obtaining a reliable comparison are not regarded as promising. The interim report calls attention to fallacies in the deductions drawn from mortality statistics by some of those interested in this problem.

[1] Industr. Hlth Res. Bd. No. 79. 1937. *Lancet*, 1937, 2, 97.

Those fallacies have already been exposed in our columns.[2]

Assuming that busmen suffer rather more than some other members of the community from digestive troubles the question remains why they are more liable to such disorders, and it is with this problem that the conference is still concerned. Digestive complaints are widespread in every walk of life; they can be, and are, attributed to many and various causes, and even a consensus of medical opinion as to why busmen have an excess of liability to gastric complaints may be difficult to obtain; irregularity of meals, speeding-up, nerve strain, and exposure to exhaust fumes may all be contributory factors and it is obviously difficult to isolate any one of these factors for a controlled inquiry. There is some resemblance between the daily activities of a busman and those of practising doctors who are also credited with an excessive liability to gastric disorders. It seems likely that for the present concentrated effort in ward and laboratory to discover the ætiology of these widespread disorders will prove to be more profitable than concentration on their incidence in any particular group or calling.

LEAGUE OF NATIONS AND NARCOTIC DRUGS

THE Secretariat of the League of Nations have, at the request of the advisory committee on opium and dangerous drugs, prepared an analytical study of the world manufacture and use of narcotic drugs from the annual reports of governments for the year 1936. In all 143 reports were received, 48 from sovereign States and 95 from dependencies, colonies, or protectorates. Among references to changes in legislation and regulations it is noted that in the United Kingdom the Pharmacy and Poisons Act of 1933 came into full operation on May 1st, 1936, but that this made no substantial changes in the law relating to dangerous drugs. The Government of India prohibited, from April 1st, 1936, the cultivation of the opium poppy in the Punjab. The Government of Uruguay has instituted a State monopoly for the purchase and sale of heroin. In Egypt the Narcotics Bureau is now a department of the independent Egyptian Government and its energetic director looks forward to further success in the suppression of illicit traffic. In Tunis there was a rapid extension during 1936 of the use of heroin and cocaine among the native population, more especially amongst young people, addiction being common both in the Jewish and the Mussulman population.

As to raw opium, the total amount produced in six provinces of China in 1936 was reported to be 1,611,698 kg. Assuming the morphine content to be 9·6 per cent., the total amount of the alkaloid in the opium produced was 154,723 kg. The cultivation of opium in British India is now confined to 2900 hectares in the United Provinces which yielded in 1936 54,190 kg., with a morphine content between 11 per cent. and 12 per cent., amounting to 4877 kg. In Iran the poppy is cultivated on 23,000 hectares, yielding a harvest estimated at 1,346,712 kg. The receipts from the opium monopoly in Iran contribute 7·5 per cent. of the total budget. In Hungary, where poppy straw is used for the manufacture of alkaloids, some 2000 hectares are under cultivation, yielding a harvest of 805,330 kg. In Macao (Portuguese) the authorities point out that where the price of prepared opium for smoking is high, or its consumption is restricted, illicit traffic in drugs, more particularly heroin, assumes large proportions. The report from Hong-Kong is disquieting. The colony is a centre of a highly organised international traffic in raw and prepared opium. The consumption of heroin pills, in some 2000 divans, is estimated at between 200,000 and 300,000 per day.

In a general survey of the world manufacture and use of narcotic drugs in 1936 the committee chronicle as "a somewhat alarming fact" a very distinct increase in the *manufacture* of the five principal drugs. That of morphine rose 20 per cent. as against the previous year, of codeine 22 per cent., of dionin 40 per cent., of heroin 30 per cent., of cocaine 5 per cent. The world consumption of these drugs also shows a general increase, notably that of heroin which in 1936 amounted to 850 kg. against 750 kg. in 1935, or approximately 14 per cent. The conclusion is reached, however, that the amounts lawfully manufactured corresponded to the legitimate world requirements, and that the tendency towards the stabilisation of production at the level of legitimate world requirements was not interrupted in 1936.

ENCEPHALITIS JAPONICA

IN the succession of waves of encephalitis lethargica which swept over Europe and other countries during the decade 1917 to 1927 the manifestations of this many-sided disease varied considerably in different years and in different places, though the outbreaks had certain typical features in common. Of these the most striking were temporary oculo-motor and other cranial nerve disturbances and gross sleep disorders, frequently followed, sooner or later, by damage to the mental or motor nervous mechanisms of a peculiar kind. The sudden appearance and wide spread of this hitherto unrecognised type of infection naturally caused it for a time to overshadow any other form of encephalitis, and it is only in recent years that we have come to view the question of encephalomyelitis in a truer perspective. It is now known that there have been other epidemic outbreaks of encephalitis almost equally severe, but differing, clinically and anatomically, from the European or Economo variety and also from each other.

Thus the severe Japanese outbreak which occurred in 1924 (actually the same year as the great outbreak in England) and the American epidemic of 1933 have been shown to be distinct varieties, neither of which conformed to the European type of infection; the virus of one type is not neutralised by the convalescent's serum of another. The question arises whether types of encephalomyelitis other than the European form may not occur sporadically in this continent as well as in Japan and the United States without being differentiated from the more familiar Economo type. As regards Germany at any rate this seems to be answered. H. Pette[1] of Hamburg during last winter saw three fatal cases of encephalomyelitis in adults which presented unusual clinical features. In two of the cases an autopsy was obtained, and anatomical changes were found which suggested that these differences were fundamental. The main symptoms were headache, vertigo, general restlessness and confusion, muscular jerkings and twitchings of a bizarre kind, difficulty of speaking and chewing, and a tendency to spasticity—sometimes more marked on one side than the other, but without definite signs of pyramidal involvement. There was usually some atypical pyrexia; there were no oculo-motor or other cranial nerve palsies, nor was there any

[2] *Lancet*, 1938, 1, 1284.

[1] Pette, H., *Münch. med. Wschr.* 1938, 30, 1137.

particular disturbance of sleep, at any rate not in the direction of lethargy. In each patient the symptoms gradually got worse and death occurred in a few weeks.

Post mortem the cerebral nervous system in the two cases examined showed nodular cell-proliferations scattered over the whole brain, but even more numerous in the grey matter than in the white. These nodes were mainly composed of microglia but contained some lymphocytes, rarely other leucocytes. In places there was more diffuse glial proliferations. The ganglion cells here and there were badly damaged; neuronophagia was rarely seen. In the spinal cord of one case there were also nodes, chiefly in the grey matter, and apart from these in many places the vessels and the meninges were more or less infiltrated with cells. Further details of the anatomical findings are to appear later when investigations are completed. Meanwhile Pette concludes that the patients died of an acute form of encephalomyelitis affecting a large part of the central nervous system, which is unlike any form of encephalitis hitherto described in Germany. In discussing the diagnosis he excludes encephalitis lethargica because of the absence of ocular or sleep disturbances and other symptoms, due to disorder of the vegetative system, characteristic of that disease; other differences are the presence of pyramidal symptoms and the peculiar character of the hyperkineses. Unfortunately, since all three cases died in the acute attack, one important means of differential diagnosis—the after-effects—is not available. This is relevant since the type of encephalitis that occurs from time to time in Japan, and that described in more recent years in America, have happily not been followed by those peculiar forms of chronic invalidism which the victims of encephalitis lethargica have made familiar in every country to which it has spread. The differential diagnosis from disseminated encephalitis is also easy. The inflammatory processes, chiefly evident in the remarkably scattered nodules of glia, spared no part of the central nervous system but showed a preference for certain areas. The fact that in the brain stem the ventral parts were more affected than the tegmental explains how it is that the cranial nerves, especially those of the eye muscles, were less damaged than the movement of the limbs.

From the diffuse character of the lesion, this disease may be properly described as a pan-encephalomyelitis. It is distinguished from other known forms of non-purulent encephalomyelitis by the fact that it neither leads to the extensive neuronophagia characteristic of poliomyelitis and encephalitis lethargica nor to the destruction of nerve sheaths commonly seen in disseminated encephalomyelitis. In Pette's opinion, his cases belong both on clinical and anatomical grounds to the group known as encephalitis japonica.

BERI-BERI IN ST. HELENA

THROUGH Dr. Philip Gosse's history of the island and a measure of publicity in Parliament and the press, attention has recently been drawn to the economic plight of the people of St. Helena. One of the by-effects of their impoverished condition is the prevalence among the islanders of beri-beri. In a careful clinical study of 107 cases, P. B. Wilkinson [1] points out that before polished rice became a staple article in their dietary the St. Helenians did not suffer from beri-beri, and he advocates that a law be passed prohibiting the importation to the island of any but brown (unmilled) rice. Three types of beri-beri are described: the rudimentary, the wet, and the dry. Most of Wilkinson's cases belong, fortunately, to the first type which responds most readily to treatment. The mode of onset of the disease is usually gradual but occasionally sudden. In the female, predisposing factors are pregnancy and parturition; in the male, arterio-sclerosis, persistent low-grade infection, or serious acute illness. Emotional stress and mental strain may also play a part. The disease almost always runs an afebrile course. Weakness of the legs, dyspnœa on exertion, and acroparæsthesiæ are among the commonest symptoms; tenderness of thighs and calves, œdema over the tibiæ, abnormalities of reflexes, glove-stocking sensory loss, and cardiovascular changes among the physical signs. The vitamin B_1 necessary for treatment is supplied by making suitable alterations in the diet or, where such are economically impossible, by giving tablets of dried yeast. Marmite has been used with good effect but is relatively expensive. A refractory case which did not respond to yeast rapidly benefited by the parenteral injection of vitamin B_1.

[1] *Caduceus*, 1938, **17**, 21.

THE STUDY OF INTESTINAL ABSORPTION

IT has become fashionable in the last six years to attribute many nutritional disorders to a failure in absorption by the intestinal canal of one or more essential substances. For instance, the fact that certain patients with Addisonian pernicious anæmia respond to liver extract given by parenteral injection, but not to liver extract given by mouth, has been put down to their inability to absorb the liver principle from the intestine. The evidence for such failure has hitherto been indirect, but Dr. Juda Groen [1] has just published experimental observations designed to demonstrate the existence of such intestinal abnormality by direct means. The principle of his method is that first developed by Miller and Abbott.[2] The upper part of the small intestine is occluded, at a measured distance below the pylorus, by a rubber balloon connected with the distal end of one of the two lumina of a rubber tube. Through the second lumen of the tube, which opens into the intestine above the balloon, 100 c.cm. of 15 per cent. glucose solution are introduced into the occluded portion of the intestine. The solution is allowed to remain there for half an hour, and then what remains of it is removed by aspiration and repeated washings. By this method it has been shown that in normal individuals the absorption value is 7 to 9 g. of glucose. Patients suffering from organic disease of the intestine associated with diarrhœa (3), tuberculous enteritis (1), ulcerative colitis (1), and non-tropical sprue (1) had greatly decreased absorption values. Diminished values were found in 3 cases of pernicious anæmia and in 1 of alcoholic polyneuritis with pellagra, and in these 4 patients absorption of glucose returned to normal after treatment. The fact that 2 patients with scurvy showed a normal absorption value suggests that deficiencies associated with the vitamin-B complex may be more likely to affect the intestine than are some other types. Since by the nature of the experiment the glucose solution was maintained in contact with the same portion of the upper small intestine, the diminished absorption was clearly due to defective capacity of the intestinal wall and not to unusually rapid passage of the intestinal contents. Further, in those cases in which the absorption of

[1] Groen, J., *New Engl. J. Med.* 1938, **218**, 247.
[2] Miller, T. G., and Abbott, W. O., *Ann. intern. Med.* 1934, **8**, 85.

glucose was diminished the blood-sugar showed a smaller rise during the absorption test than that of the normal subjects used as controls. Groen concludes that the flattened sugar curves found in certain dietary deficiency states, such as sprue, are due, at least in part, to a diminished absorptive power of the intestine. His observations, apart from their intrinsic interest, draw renewed attention to a valuable experimental method for study of intestinal function.

C. H. FAGGE (1838-83) RECALLED

To an age characterised by specialisation and by the imprisonment of knowledge in water-tight compartments, the quiet figure of Charles Hilton Fagge, the centenary of whose birth occurred on June 30th, brings a message at once salutary and refreshing. Though steeped in the literature of medicine—he was a good French and German scholar—he was no mere gatherer of different theories and views. His mind was essentially practical, and his heart was in the wards. An accomplished clinician and a sound pathologist he combined infinite patience, tireless industry, and an immense memory with the remarkable faculty of spotting the salient features of any problem. Minute or narrow inquiries held no charm for one who loved to attack broad many faceted propositions. Thus it was that his "Principles and Practice of Medicine" (completed by P. H. Pye-Smith and Samuel Wilks) remains to this day one of the really great books in modern medicine, solid in its learning, masterly in its style, and philosophical in its attitude. Son of a general practitioner and nephew of John Hilton, of "Rest and Pain" fame, Fagge as a student had a brilliant, if not unique, career at Guy's. After graduating M.D. Lond. in 1863, he served his hospital as demonstrator of anatomy, medical registrar, assistant physician with charge of the out-patient skin department (he translated Hebra for the Sydenham Society), lecturer on pathology, curator of the museum, and physician. For many years he edited the *Guy's Hospital Reports*. Of middle height, he impressed his colleagues and students as a gentle, unassuming, sensitive, and absolutely honest man. Physically at least he was strikingly unlike his picturesque uncle. It was characteristic of the scientist that in his last illness —for eighteen months before his death on Nov. 18th, 1883, in his forty-sixth year, he suffered from an aortic aneurysm—he made a clinical case of himself, for his own edification probably as much as for the benefit of medicine in general.

A COMPLICATION OF APPENDICITIS

THROMBOPHLEBITIS as a complication of appendicitis has been described in two very different forms: in one, it affects the appendicular vein and, by spread via the ileocolic and superior mesenteric veins, may give rise to pylephlebitis, which is a very fatal disease. In the other, retroperitoneal spread of infection involves the iliolumbar veins, and leads to thrombophlebitis in the ascending lumbar veins, and eventually possibly to a lumbar abscess. This latter form is described by Dr. Emil Altschüler (p. 726) as having a uniformly favourable prognosis. He has seen about a dozen cases, mostly following retrocæcal appendicitis. The important point is to recognise the nature of the condition, otherwise drastic measures may be taken to combat a serious condition wrongly diagnosed. There is an indefiniteness about the symptoms as he describes them which might excuse some wavering in diagnosis. The pain shifts from one side to the other, presumably because the two ascending lumbar groups of veins communicate, and the meteorism may lead quite justifiably to suspicion of intraperitoneal spread of infection. The localising signs seem to be tenderness and slight œdema in the lumbar region; and the surgeon has to be on the look-out for evidence that an abscess has formed and needs opening. Pylephlebitis has long been recognised as one of the rarer but most fatal complications of acute appendicitis. Hawkes[1] believes that, with care in pre-operative diagnosis and in observation at the time of operation, it should be possible to anticipate the case that is likely to develop pylephlebitis and, by appropriate venous ligature, to prevent septic emboli reaching the portal vein. Thrombophlebitis of the appendicular vein is to be suspected when the symptoms of appendicitis are complicated by one or more rigors. In several of the cases reported by Hawkes the occurrence of chills at first clouded the issue, and the danger is that operation may be delayed by refusal to diagnose appendicitis in the presence of rigors and high pyrexia. In these cases Hawkes advises ligature of the ileocolic vein above the thrombus before appendicectomy is performed. It would seem a wise precaution to look for thrombosis of the appendicular vein in cases of gangrenous appendicitis, even in the absence of pre-operative rigor. Apparently ligature of the ileocolic vein has never produced gangrene of the intestine. Lower ligature may prove ineffective owing to the variations that occur in the origin and anastomosis of the appendicular vein. Hawkes presents the clinical histories of 24 cases, 16 of which were proved and 8 presumptive. All were operated upon and 8 died. In some of the patients who recovered the appendicular vein had been felt at operation as a thickened cord. Ligature of the ileocolic vein must have saved some of these patients from liver abscesses and a stormy convalescence, if not from fatal pylephlebitis.

HÆMOLYTIC STREPTOCOCCUS CARRIERS

SINCE the recognition of the fact that hæmolytic streptococcal infections in the puerperium are commonly derived from respiratory tract infections in attendants, the question of carriers of these organisms amongst maternity hospital staffs has become of great importance. Stimulated by the occurrence of three cases of severe puerperal sepsis in a period of three weeks in the same hospital in Melbourne, Bryce and Tewsley[2] made a careful bacteriological and clinical study of the contacts of these patients, and also of the whole of the resident medical and nursing staff of the hospital some months after the outbreak. Unfortunately, for reasons not stated, two of the three patients had not been investigated completely, and only one is known definitely to have been a case of hæmolytic streptococcal infection. The interest of the observations lies in the hæmolytic streptococcus carrier-rate in the medical and nursing staff. Out of 32 contacts of the infected patients, 7 showed hæmolytic streptococcus group A in the respiratory tract, while in two other batches of 67 and 74 persons examined some months later, who were not recent contacts of infected cases, the carriers numbered respectively 2 and 5. Correlating the carrier state with the clinical condition of the throat, the authors found that in persons with healthy respiratory tracts the presence of hæmolytic strepto-

[1] Hawkes, S. Z., *Surg. Gynec. Obstet.* January, 1938, p. 62.
[2] Bryce, Lucy M., and Tewsley, Phyllis, *Med. J. Aust.* 1938, 1, 639.

cocci in throat swabs appeared to be closely associated with recent contact with streptococcal illness. In those with clinically detectable abnormality of the nasopharynx there was a greater tendency to harbour hæmolytic streptococci irrespective of recent contact. Unfortunately the contact group was swabbed in January and the non-contact groups in May, June, September, and October, so that any differences observed in the carrier-rate might be due to seasonal variation. But the fact remains that a number of individuals with "clinically normal" throats were found to be carrying the hæmolytic streptococcus group A, some of them on several occasions. The authors recommend that midwives in training and those applying for senior permanent appointments should undergo an examination "of the history and condition of the upper respiratory tract by a rhinologist, with coöperation of bacteriologist and radiologist if necessary." Would it not be better, following the practice of at least one large London maternity hospital, to change the order and put the bacteriologist first? In this way only can we determine quickly and with some degree of certainty whether a person is likely to be a bacteriological danger.

RESISTANCE TO TRANSPLANTED TUMOURS

THE earliest recorded experiment on heterologous transplantation, and possibly in cancer research, was made by Peyrilhe,[1] who attempted to transfer cancer from man to a lower animal by injecting "about two drachms" of fluid "from a cancerous breast by means of a syringe, into a small wound made into the back of a dog." Hetero-transplantation—the propagation of a tumour in an alien species—continues to exercise a curious fascination although, so far as the problems of cancer are concerned, the subject is chiefly of academic interest. Similarly, the phenomenon of resistance to cancer grafts, often wrongly called "cancer immunity," is of no particular significance in cancer; it is, in the words of Peyton Rous, "a resistance directed against a graft as a strange tissue and unconnected with the neoplastic qualities which that tissue happens to possess."

Dr. J. Clemmesen of Aarhus quotes this dictum in an exhaustive review[2] of the literature of heterologous transplantation and presents very fully the results of his own investigations on the effects of exposure of the whole animal to X radiation on the resistance to injections of foreign cells. He has shown that strong X radiation, administered immediately before grafting a fragment of cancer tissue derived from another species of animal, reduces the resistance often to the level at which foreign cells may proliferate and form large daughter tumours, which, however, always in the end regress. Dr. Clemmesen recognises that a sharp line must be drawn between transplanted and autochthonous tumours but he is disinclined to make any rigid distinction between homologous and heterologous tumour transplantations.

COMPULSORY IMMUNISATION

ANTIDIPHTHERITIC immunisation has just been made obligatory in France. All children must be injected with prophylactic during the second or third year of life; older children at present at school, if not previously immunised, must be given three doses of prophylactic. The law does not at present insist on Schick-testing before or after immunisation; possibly this may be enforced by regulations. The obligation to protect against diphtheria, now statutory not only in France but in Rumania, Hungary, and some smaller countries, certainly rests on a logical basis. No practicable method of mass vaccination will give hundred-per-cent. protection, but we know that a group of people injected with suitable prophylactic and exposed to diphtheria thereafter will escape infection almost entirely. Twenty years ago one in ten of fever hospital nurses contracted diphtheria every year; to-day in hospitals where the staff is vaccinated against diphtheria the attack-rate is practically nil. France under the dominant influence of Ramon remains faithful to formol toxoid, as do other parts of Europe under French influence, and also Canada. In England, where alum toxoid was discovered, and in the U.S.A., the trend is towards the use of this preparation. Chesney[1] has found that at Poole, Dorset, where the natural Schick-negative rate is very low, 99 per cent. of 1500 children immunised yielded a negative reading after the injection of two doses of alum toxoid separated by four weeks—the length of this period is important.

It would be hard to foretell the influence of compulsion on any particular public health measure. The reaction to personal danger is an easier emotion to play on than the more cultivated sense of responsibility for the welfare of the group. A community which eagerly asks for protective measures against poliomyelitis may yet hesitate to accept the simple and highly effective immunisation against the less unfamiliar diphtheria at the hands of its public health authority. To the student of social change the evolution in any country of the machinery for carrying out compulsory injections, for treating the occasional sore arm and the mother's alarm, and for dealing with the inevitable attempts to evade the law, must provide a subject of particular interest.

Sir Edward Mellanby, F.R.S., will deliver the Harveian Oration to the Royal College of Physicians of London on Tuesday, Oct. 18th, at 4 p.m.

THE LANCET 100 YEARS AGO

September 22nd, 1838, *p.* 23.

From a review.

. . . the value of a medical work is sometimes to be estimated in the inverse ratio of its size. Such, we fear, is the case with Dr. G. H. Roe's Treatise upon Hooping-Cough, and if the Fellows of the Royal College of Physicians, being at the same time officers of hospitals, cannot produce something more healthy in aspect, or endowed with a greater share of viability, we recommend them to prolong the time of gestation to an indefinite period. The Spartans, it is said, were in the habit of strangling their weakly or misshapen offspring, lest that, when arrived at manhood, they might endanger, through physical deficiency, the welfare of the commonwealth. We cannot look for Spartan stoicism in the 19th century, nor can we expect that Dr. Roe should be guilty of the crime of infanticide; but in performing the deed for him we are supported by the consciousness that we shall have "done the state some service."

Here we had expected to meet with facts and observations, which, if not new, would at least be original; but we must confess that we were brought to an abrupt check on finding that, of the *eleven* cases which are detailed for the purpose of exhibiting the pathological anatomy of pertussis, only *two*, and those two of a most meagre character, belong to the author, . . . Second-hand observation in medicine is worse than hearsay testimony in a court of law. We have little faith in the powers, as a linguist, of the man "whose *cousin* played upon the German flute;" . . .

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[1] A Dissertation on Cancerous Disease. London. 1775.

[2] The Influence of X-Radiation on the Development of Immunity to Heterologous Transplantation of Tumours. By Johannes Clemmesen. London: Humphrey Milford, Oxford University Press. 1938. Pp. 160. 10*s*.

[1] Chesney, G., *Lancet*, Sept. 3rd, 1938, p. 588.

SPECIAL ARTICLES

DETECTION OF CHRONIC TYPHOID CARRIERS BY AGGLUTINATION TESTS

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The occurrence in this country during the past few years of typhoid outbreaks of considerable magnitude has revived interest in the problem of the chronic typhoid carrier. In some of these outbreaks the true source of the infection—viz., the carrier responsible for the outbreak—has been established and removed from his or her place of employment. The general position, however, is still much the same as it was thirty years ago, when investigations on the carrier problem were conducted in this country by Ledingham (1908, 1910, 1914); that is to say, the existence of a carrier in a place where his or her presence is a permanent danger to the community remains nearly always unknown until the outbreak occurs.

The detection of typhoid carriers is one of the difficult tasks confronting the public health administrator and the bacteriologist. It is true that more recently the methods of isolating typhoid bacilli from the fæces have been greatly improved through the introduction of refined culture media, particularly the bismuth sulphite medium of Wilson and Blair (1927, 1931). Nevertheless, the search for typhoid carriers still remains a complicated matter, owing not only to technical difficulties inherent in the cultural methods of examination but also to the well-known intermittency in the excretion of the bacilli, which is a striking feature in the most common type of typhoid carrier—namely, the fæcal excreter.

So far serological methods have not contributed much to solve the difficulties. Agglutination tests have been recommended for preliminary surveys whenever large groups of persons are suspected as possible carriers, with a view to limiting cultural examination to those giving a positive Widal reaction. The following quotations from monographs on typhoid carriers illustrate how the value of such agglutination tests has been assessed by various authors.

Ledingham and Arkwright (1912): "About two-thirds to three-quarters of all chronic carriers give a well-marked Widal reaction (titre of 1 in 100 or at least 1 in 50)."

Browning et al. (1933): "While positive results are significant, these tests in general do not give reliable information, since carriers not infrequently yield negative reactions."

Havens (1935): "The presence of agglutinins has no bearing on the carrier condition. Many persons who are not carriers have typhoid agglutinins in their sera, while probably the majority of carriers give a negative reaction to the test."

Because of the unsatisfactory results of the ordinary Widal tests other serological reactions have been suggested as an aid to the detection of the carrier condition: opsonic tests by Ledingham (1908) and complement-fixation tests by Pijper and Pullinger (1928). These complicated methods, however, have not been subjected anywhere to extensive tests. More recently the estimation of the O agglutinin titre has been suggested (Pijper 1930, Ashby 1931, Wyllie 1933), while Kristensen and Poulsen (1933) have recommended an agglutination technique which does not distinguish between O and H agglutination and makes use of positive reactions with very strong serum concentrations (dilutions 1 in 5 and 1 in 10). The very existence of these different recommendations seems to indicate that none of the methods provided a sufficiently reliable test for spotting typhoid carriers.

The observation of a significant Vi antibody titre in a chronic carrier in Palestine, published in a previous paper (Felix, Krikorian, and Reitler 1935), led to the suggestion that possibly Vi agglutination may contribute a useful method of detecting chronic carriers. This possibility has been explored during the past three years and the results so far obtained would appear to have amply justified the expectation.

CARRIERS IN MENTAL HOSPITALS

Most of the typhoid carriers from this country, from whom serum could be secured for examination, were patients in mental hospitals. Table I shows the titres of H, O, and Vi agglutination observed in the first group of patients examined. All of them were females from one hospital, where they had been segregated because they were considered to be chronic typhoid carriers.

TABLE I—FEMALE PATIENTS IN A MENTAL HOSPITAL CONSIDERED TO BE CHRONIC TYPHOID CARRIERS

Case	History before serum test. Dates of isolation of typhoid bacilli.		October, 1935. Titres of agglutinins.			History subsequent to serum test.	
	Fæces.	Urine.	Vi	O	H	Jan.–Feb., 1936.	1936–38.
1	..	1923	0	0	200	Negative. Fæces 5 × Urine 5 ×	Consistently negative. Fæces. Urine and duodenal juice.
2	..	1923	0	0	0		
3	..	1923	0	0	40		
4	1923	..	0	0	100		
5	..	1923	0	0	100		
6	1925	..	5	0	100	Fæces positive.	..
7	1924–27	..	5	200	200		..
8	1923–26	..	60	500	1000		..
9	1931	1931	40	0	100		..
10	1935	1935	10	0	200		..
11	1931	..	20	0	200		..
12	1925–28	..	10	100	500		..

Vi agglutination: Titre O = a negative result in a dilution of 1 in 5.
O " " O = " " 1 in 100.
H " " O = " " 1 in 20.

It is seen from Table I that the sera from the 12 cases could be sharply divided into two groups according to their reaction in the Vi agglutination test. The first 5 sera did not contain Vi antibody in a significant titre, whereas the remaining 7 sera did; there was no corresponding difference in the H and O titres in the two groups.

It was first thought that the cases giving the positive Vi reactions were carriers of Vi strains of *Bact. typhosum*, whilst the negative cases possibly were carrying bacilli which did not contain Vi antigen. The bacteriological examination of the excreta of

the 12 cases, kindly performed by the pathologist to the hospital, soon revealed the fact however that the first 5 patients no longer excreted typhoid bacilli, whereas the remaining 7 patients did. The cases giving the negative results were re-examined very thoroughly many times in the course of the subsequent three years and in no instance could typhoid bacilli be isolated from their fæces or urine. The duodenal juice from 4 of these patients was also examined twice and did not yield typhoid bacilli. The 5 persons evidently had been excreting typhoid bacilli only temporarily during 1923 and had since been considered, but erroneously, to be chronic carriers.

The sera from 10 of the 12 patients were again tested 2½ years after the first examination. In each case the earlier sample of serum was still available and was retested simultaneously. The titres of the three antibodies were almost identical in the two series, with the exception of the O titre in No. 9, which had risen very considerably (dilution 1 in 1000).

Another group of 32 carriers and alleged carriers, collected from a number of mental hospitals, was examined in a similar manner.

The results summarised in Table II do not call for much comment. All the persons giving a positive Vi reaction were shown by subsequent bacteriological

TABLE II—CARRIERS AND ALLEGED CARRIERS FROM VARIOUS MENTAL HOSPITALS

—	Vi agglutination.	
	Positive.	Negative.
Examined sera from 32 carriers and alleged carriers	16	16
Proved chronic carriers	16	2
Non-carriers	0	10
Not decided	0	4

examinations, performed by the pathologists to the various hospitals, to be true chronic carriers. Amongst the 16 negative cases were 10 non-carriers and 2 carriers; 4 remained undecided. Since the investigation of this group extended over nearly two years it was in some instances possible to obtain from the post-mortem reports confirmation of the diagnosis arrived at from the intra-vitam examinations.

It is of interest also to mention that 25 strains of *Bact. typhosum*, isolated from chronic carriers in this country, were all found, without any exception, to contain the Vi antigen. This is in good agreement with the reports published from Canada (Craigie and Brandon 1936), the United States of America (Welch and Mickle 1937), India (Bensted 1937), and from other parts of the world.

PERSONS HARBOURING TYPHOID BACILLI WITHOUT EXCRETING THEM

It had thus been established that the frequency of a positive Vi reaction in the serum from chronic typhoid carriers is remarkably high. Meanwhile, following the suggestion made by Felix, Krikorian, and Reitler (1935), similar investigations had been conducted in Italy by Giovanardi (1936, 1937) and in South Africa by Pijper and Crocker (1937a), and the reports published by these workers, though based on comparatively small figures, clearly pointed in the same direction.

Some observations however were made which seemed to diminish very considerably the significance of the Vi agglutination test. In the course of an investigation of 100 female patients in a mental hospital 5 persons were found to give Vi agglutination reactions in titres that were considered to be characteristic of the carrier state. Yet these persons were not excreting typhoid bacilli with their fæces and urine, and so far as could be ascertained none of them had a history of an attack of typhoid fever. The duodenal juice of these patients could not be examined, but a repeat test on the blood-sera, taken after an interval of one year, showed that the positive Vi reactions persisted in entirely unaltered titres.

Fortunately a case came under observation, through the coöperation of Prof. L. P. Garrod of St. Bartholomew's Hospital, that suggested an explanation of the rather distressing findings in the serum from the 5 mental patients. The case was one of an empyema in a man who had typhoid fever forty years ago. The empyema resulted from a typhoid osteitis of a rib and a resection was performed (Lane and Francis 1938). The serum from the patient had a significant Vi titre (1 in 20), though typhoid bacilli were not found in his fæces, urine, or duodenal juice.

It has, of course, been known for many years, from post-mortem observations or surgical operations, that typhoid bacilli may persist in lesions of the periosteum and possibly other sites after recovery from typhoid fever. The observation of a positive Vi reaction in the case of empyema was however most welcome, since it suggested that the significant Vi titres, observed in the 5 mental patients without histories of typhoid fever, probably were due to their harbouring typhoid bacilli without excreting them. Pijper and Crocker (1937b) concluded that "all persons possessing significant amounts of Vi agglutinin had better be regarded as carriers." This conclusion at first appeared to be rather sweeping, but it might be valid if the term "carrier" were extended to include also those persons who are harbouring typhoid bacilli but do not excrete them. What proportion of the general population belongs to this category is unknown. It probably varies in different localities according to the prevalence of typhoid fever. But it seems reasonable to assume that generally the proportion of such persons will be found to be very much lower than that established in the particular sample of mental patients tested.

FREQUENCY AND TITRES OF THE Vi REACTION IN PROVED CHRONIC CARRIERS

In addition to the carriers from mental hospitals, recorded in Tables I and II, a number of sera from proved chronic carriers could be examined from this country and also from some countries abroad, where typhoid carriers are registered and to a certain extent kept under observation.

TABLE III—FREQUENCY OF A POSITIVE Vi REACTION IN PROVED CHRONIC CARRIERS

Carrier sera from—	Number tested.	Vi agglutination in a titre of 1 in 5 or higher.		
		Positive.	Doubtful.	Negative.
England ..	10	10	..	..
Norway ..	4	3	1	..
Hungary ..	22	20	1	1
Total ..	36	33	2	1

The cases included in Table III were all declared chronic carriers; that is to say their carrier condition

was known to have persisted at least for one year. Some of them were known to have had their attack of typhoid fever more than twenty years ago. Though the figures are too small to permit of the calculation of the proportion of cases giving a positive reaction, it is quite clear from Table III that the frequency of a positive Vi reaction in these 36 cases was remarkably high.

In Table IV are specified the titres of Vi agglutination observed in all the carrier sera which have been recorded in the preceding Tables.

TABLE IV—Vi AGGLUTININ TITRES OBSERVED IN 56 CHRONIC CARRIERS

Vi agglutinin titre against strain "Watson."	Cases.
1 in 5	18
1 in 10	18
1 in 20	11
1 in 40	4
1 in 80	3
1 in 200	1
1 in 300	1
Total	56

Table IV shows that most of the sera tested gave Vi agglutination in very low titres. In about one-third of the sera the titre only reached a dilution of 1 in 5, in one-third it was 1 in 10, and only one-third reacted in 1 in 20 or in some higher dilution. There was apparently no correlation between the height of the titre and any of the data secured from the histories of the cases, such as the age or sex of the carrier, the duration of the carrier condition, or whether the bacilli were excreted with fæces or urine or both ways.

So far as could be ascertained the reaction appears to be independent of the intermittency in the excretion of bacilli. This fact is likely to gain for the Vi test a definite place in the routine diagnosis of chronic carriers.

THE PRACTICAL APPLICATION OF THE Vi AGGLUTINATION TEST

During the past few months the Vi agglutination test has been employed in the investigation of certain typhoid outbreaks and proved its value as an indicator of the carrier condition. Table V may serve as an example.

The sera from 15 workmen, who were under the suspicion of including a typhoid carrier, were tested for their content of H, O, and Vi antibodies. One of the men (No. 8) had a history of a previous attack of typhoid fever and was therefore especially suspected. However, his serum did not contain Vi antibody, though it reacted in H and O agglutination, and his fæces and urine did not contain typhoid bacilli. Two men gave significant Vi agglutination reactions (Nos. 11 and 13) and were designated as the true "carrier suspects," and Dr. W. M. Scott of the Ministry of Health, who conducted the bacteriological examination of the workmen, isolated typhoid bacilli from the fæces of those two persons. One of them was a profuse excreter and could be detected readily by cultural examination; the other, according to Dr. Scott's report, might easily have been missed, since samples of his fæces on first examination were found to be negative and later yielded only scanty colonies.

Table V also shows that H and O agglutination were of little help in revealing the carriers in this group. In addition to the 2 carriers, who had received T.A.B. inoculations during the war, there were in the group 7 other persons inoculated during 1914–18, and it is noteworthy that the serum from 5 of these persons tested in 1937 still gave marked H agglutination.

A very similar result was obtained in another typhoid outbreak investigated by Dr. Scott, when the carrier was detected by the Vi agglutination test out of a group of 9 persons under suspicion.

TABLE V—DETECTION OF TYPHOID CARRIER SUSPECTS IN A GROUP OF WORKMEN

Workman.	T.A.B. inoculation, 1914–18.	Titres of the antibodies present in the sera.		
		Vi	O	H
1	No	0	0	0
2	No	0	0	0
3	Yes	0	0	0
4	Yes	0	0	1 in 20
5	No	0	1 in 100	0
6	Yes	0	0	0
7	Yes	0	0	1 in 20
8*	Yes	0	1 in 100	1 in 50
9	Yes	0	0	1 in 20
10	No	0	0	0
11	Yes	1 in 20	0	1 in 50†
12	No	0	0	0
13	Yes	1 in 10	1 in 100	1 in 50†
14	Yes	0	0	1 in 20
15	No	0	0	0

* Had typhoid fever in India. † Diagnosed as carrier suspect. See Table I for remarks on titres O.

Again, no indication of the true suspect was derived from the H and O agglutination tests.

It is not suggested that the Vi agglutination reaction, and for this matter any other serological test, could serve as final proof of the carrier condition. On the one hand, the negative reaction does not definitely exclude the carrier state, since the test cannot be expected to yield a positive result in 100 per cent. of the cases. On the other hand, a positive reaction may occur in conditions other than that of the true chronic carrier, as has been described in a previous section. But according to present knowledge it would appear that Vi agglutination is the best serological test for revealing the true carrier suspects, and is for this purpose certainly superior to H or O agglutination.

TECHNIQUE OF THE Vi AGGLUTINATION TEST

The technique of the Vi agglutination reaction is not so simple as those employed for H or O agglutination. The Vi agglutinin titre of a given serum, when estimated against different strains of *Bact. typhosum*, varies over a wide range, according to the Vi antigen content of the culture employed. The more Vi antigen is present in a culture the lower is the titre of the Vi agglutination reaction obtained with that culture and vice versa. Since the Vi antigen content is very liable to variation a standard agglutinating serum is required for standardising the agglutinability of the suspensions used for the estimation of the Vi antibody.

The essential points to be strictly observed are :—

(*a*) Selection of suitable Vi strains.

(*b*) Standard conditions of maintenance of the cultures, which are used either in the living state or in the form of formolised suspensions.

(*c*) Inclusion in each test of controls with pure Vi, O, and H sera of known antibody titres.

The technical details need not be described here as they are discussed in a paper now in the press (Felix 1938). That paper is dealing with the quantitative estimation of the high-titre Vi antibody contained in therapeutic antityphoid serum from the horse, but the procedure is identical with that applied to tests on the low-titre sera from chronic carriers.

It is seen from Table IV that the strain "Watson," which is known from earlier work, serves as the standard culture for the estimation of the Vi agglutinin titre. Definite Vi agglutination of this culture with a serum dilution of 1 in 5, when established under standard conditions, is taken as a significant reaction. It must be remembered that sera from persons who cannot be shown to be carriers occasionally also give positive reactions in 1 in 5 or even in higher dilutions and this may lead to a person being wrongly designated as "carrier suspect." However, such temporary suspicion is unavoidable in any survey for carriers and need not cause complications in administrative practice if it is borne in mind that the serum test only serves as a preliminary to the subsequent bacteriological examination of the fæces, urine, or duodenal juice.

SUMMARY

The Vi agglutination reaction is recommended as an aid to the detection of chronic typhoid carriers. The frequency of a positive Vi reaction is high and is independent of the intermittency of bacillary excretion.

This investigation was made possible by the coöperation of Prof. C. H. Browning of Glasgow; Dr. F. Golla of the mental hospitals department of the London County Council; Dr. W. D. Nicol of the Horton Mental Hospital; Dr. J. H. MacDonald and Dr. L. D. Gardner of the Hawkhead Mental Hospital, Glasgow; Dr. W. R. Wiseman of the Public Health Laboratory, Glasgow; Dr. J. R. Hutchinson and Dr. W. M. Scott of the Ministry of Health; Dr. I. Lovrekovich of the State Hygienic Institute of Budapest; and Dr. M. Tesdal of the Hygienic Institute of Oslo. I am glad of this opportunity of thanking all of them for their kindness, and also Miss R. M. Pitt for help in maintaining the cultures.

REFERENCES

Ashby, W. R. (1931) *J. Path. Bact.* **34**, 109.
Bensted, H. J. (1937) *J. R. Army med. Cps*, **68**, 1.
Browning, C. H., et al. (1933) *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 179.
Craigie, J., and Brandon, K. F. (1936) *J. Path. Bact.* **43**, 249.
Felix, A. (1938) *J. Hyg., Camb.* (in press).
— Krikorian, K. S., and Reitler, R. (1935) *Ibid*, **35**, 421.
Giovanardi, A. (1936) *Boll. Soc. ital. Biol. sper.* **11**, 163, 943.
— (1937) *Z. Hyg. InfektKr.* **120**, 273.
Havens, L. C. (1935) The Bacteriology of Typhoid, Salmonella and Dysentery Infections and Carrier States, New York.
Kristensen, M., and Poulsen, K. A. (1933) *Zbl. Bakt.* (Orig.), **128**, 450.
Lane, C. R. T., and Francis, A. E. (1938) *Lancet*, **1**, 612.
Ledingham, J. C. G. (1908) *Brit. med. J.* **2**, 1173.
— (1910) *Rep. loc. Govt Bd publ. Hlth*, n.s. No. 43.
— (1914) *Ibid*, Appendix B, No. 1.
— and Arkwright, J. A. (1912) The Carrier Problem in Infectious Diseases, London.
Pijper, A. (1930) *J. Hyg., Camb.* **29**, 380.
— and Crocker, C. G. (1937a) *Ibid*, **37**, 332.
— — (1937b) *S. Afr. med. J.* March 7th.
— and Pullinger, B. D. (1928) *Brit. med. J.* **1**, 587.
Welch, H., and Mickle, F. L. (1937) *Amer. J. publ. Hlth*, **27**, 351.
Wilson, W. J., and Blair, E. M. McV. (1927) *J. Hyg., Camb.* **26**, 374.
— — (1931) *Ibid*, **31**, 139.
Wyllie, J. (1933) *Amer. J. Hyg.* **18**, 393.

AUSTRALASIA

(FROM OUR OWN CORRESPONDENT)

PRACTICE IN NEW SOUTH WALES

THE Medical Practitioners' Bill, now before the Legislative Assembly in New South Wales, has been introduced to amend the law relating to the registration of doctors, and to regulate the qualifications for, and the effect of, registration. The major part of the Bill has the general approval of the medical profession notably in regard to the clauses regulating advertisements for patent medicines. In some respects, however, it is held to go too far. As it stands it not only prohibits the use of a medical practitioner's name in any advertisement to promote the sale of food, drugs, or appliances, but makes it impossible for the proprietor of any drug, instrument, or appliance to draw the attention of doctors to a report on its value by a fellow practitioner. The arrangements for the representation of the profession on the proposed Medical Board have also been criticised. The proposal is that the Board should consist of not less than seven or more than nine members, all registered practitioners, but only one may be nominated by the New South Wales branch of the British Medical Association. The Bill provides for the automatic registration of graduates from any university in Australia, Great Britain, Ireland, and New Zealand. Foreign doctors may obtain registration only when they have taken fourth, fifth, and final year examinations as prescribed by the University of Sydney, irrespective of their previous qualifications, and they may do so only if the foreign country concerned offers equal rights to Australian graduates. Special provision is made for foreign graduates engaged in teaching and research work. The number of medical students graduating each year from the University of Sydney is already greater than the local demand. A medical practitioners' charges committee is also proposed to review practitioners' fees on the complaint of patients. It is of interest to note that though in Queensland the British Medical Association has provided a medical fees tribunal for the same purpose there has been little demand for its services.

HEALTH INSURANCE IN NEW ZEALAND

Following the official rejection of their proposals for a scheme of medical service based on individual means with an income limit approved by the Association, the New Zealand branch of the British Medical Association has broken off discussions with the Government. The president of the Association stated that a secret ballot showed that only 45 out of 913 members favoured the Government's plan and that the opposition of the majority was on scientific as well as economic grounds. Many hold that the introduction of a costly system of National Health Insurance which will provide only a universal general practitioner service will not materially advance the promotion of health unless unsatisfactory conditions of work, environment, and nutrition, especially of the young, are also adjusted. The difficulty of workers in New Zealand is not to obtain ordinary medical attention. Provision for major illness and specialist services for the poorer members of the community is regarded by the Association as a far greater need than provision of an incomplete service for the whole of the community. The general practitioner should have available for his assistance all modern diagnostic services, and under the proposed system these services would not be provided. The introduction of the

Government's scheme would abruptly change the whole nature of medical practice in New Zealand and would involve the establishment of entirely new relations between the profession and the public. The risk involved in such a drastic reorganisation does not seem to be justified by its possible advantages.

POLIOMYELITIS IN AUSTRALIA

In view of the unusual features, especially in the early stages of the attack, of the Victorian epidemic of poliomyelitis in 1937, the virus was isolated from several fatal cases and examined. Burnet and Keogh,[1] working at Walter and Eliza Hall Institute, Melbourne, have reported that intracerebral inoculation of monkeys with material from the spinal cords of fatal cases produced typical symptoms, but with variability in the incubation period. The virus was more readily transferred to the monkey than strains obtained during non-epidemic periods. On testing some monkeys which had been allowed to survive by intracerebral inoculation of the Rockefeller Institute strain MV, it was found that the recently isolated strain had a significant antigenic resemblance to the classical strain of poliomyelitis virus, since the test monkeys survived inoculation with many lethal doses of the MV strain. The strains, however, are not identical, MV producing symptoms in the immune monkeys very similar to those resulting from inoculation of a weak poliomyelitis strain in non-immune animals. Since the outbreak of the epidemic in Victoria in June, 1937, a total of 2081 cases has been reported with 106 deaths. This represents 11 cases per 10,000 of population, with a case-mortality rate of 5·1 per cent. In Tasmania, since November, 1937, there have been 956 cases with 62 deaths. In other States there has been less illness but a higher case-mortality rate. In the last three months the incidence has fallen almost to non-epidemic levels.

SERUM FOR CHINA

Australia has provided 500,000 doses of serum, as part of a world gift of 6,000,000 doses, to aid China in her present fight against cholera. The Commonwealth serum laboratories prepared the serum, which is valued at approximately £4000.

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENTS)

EXPERIMENTS IN CONTRACT PRACTICE

NOTHING is heard at the moment about the intervention of the Department of Justice in the conflict between the Group Health Association and the Medical Society of the District of Columbia. Meanwhile similar experiments are projected in different parts of the country. In New York City a "Coöperative Health Association" proposed to contract with a group of physicians for complete physicians' services to its members at the rate of $24 per year for the first person and $20 per year for each additional person in a family. The attorney general's office in New York has unofficially expressed the opinion that this plan should be held in abeyance pending clarification of its legal status. Such clarification may be sought by the officers of the association through a court decision. An editorial in the bulletin of the King's County medical society suggests that the borough of Brooklyn be offered medical care insurance under the auspices of the Associated Hospital Service, the successful organisation for group hospitalisation in New York City. One of the private insurance companies in Detroit is actually writing hospital insurance policies which include medical and surgical care while in hospital and limited laboratory, X ray, and operating-room expense. Coöperative hospitals are now being considered, according to the Association of Medical Coöperatives, in Washington D.C., Milwaukee, and in Oklahoma City. The first steps have also been taken towards providing a coöperative hospital in Clay County, Missouri, a county of more than 20,000 population which is served by one private hospital with 40 beds. After considerable struggle the New York State Constitutional Convention has adopted a social welfare article which includes a provision permitting the legislature to provide for "the protection by insurance or otherwise against the hazards of unemployment, sickness, and old age." At one time the word sickness was removed from this sentence by a majority of 61 to 60 but after reconsideration it was reinstated. The article will be submitted with other proposed amendments to the State constitution in a popular referendum next November.

An important conference on rural medicine is to be held in Cooperstown, N.Y., on Oct. 7th. The conference will consider (1) rural morbidity, (2) health department and school health programmes, (3) post-graduate medical education, and (4) the economics of rural medicine. The speakers will include representatives of the American Medical Association, the public health service, and the universities.

SICKNESS AND UNEMPLOYMENT

Further analysis of the morbidity survey made in the winter of 1935–36 has produced fresh evidence of the relationship between sickness and unemployment. Mr. George St. John Perrot, director of the survey and statistician of the U.S. Public Health Service, estimates for this country an average daily disability and average annual loss from illness and death of four million people and ten billion dollars ($10,000,000,000) respectively. Among white workers 15–64 years of age the rates per 1000 disabled by illness on the day of the canvass were: for unemployed 39·5, for employed 19·5, for those seeking work 43·0, and for those on work relief 30·0. The highest illness rates were found in the older age-groups, in the lower income classes, and amongst the unskilled. One-third of all illness was due to upper respiratory infections. The disproportion of sickness among the unemployed was most marked in the case of nervous diseases, where the ratio was 17 of the unemployed to 2 of the employed.

PREMARITAL EXAMINATIONS AND THE MARRIAGE RATE

Experience shows that when one of the States adopts effective laws requiring examinations for syphilis as a prerequisite to a marriage licence the number of marriages in that State promptly shows a decrease. Connecticut adopted such a law in January, 1935, and the marriages in that State dropped from 13,000 in 1935 to 8000 in 1936. At the same time the number of marriages in New York State counties adjoining the State of Connecticut increased by more than 50 per cent. The Domestic Relations Law in New York State took effect on July 1st last. The number of marriages in upstate New York during July, 1938, was 4275 as compared with 7243 marriages in July, 1937. However, as is pointed out by the State's registrar of vital statistics, Dr. J. V. De Porte, in a statement issued to-day (Sept. 4th), the decline in the number of non-resident

[1] *Med. J. Aust.* 1938, 2, 4.

marriages is much greater than the decline of resident marriages—77 per cent. as compared with 23 per cent. Non-residents are affected not only by the new Domestic Relations Law but also by a law passed last year which requires an interval of 72 hours between issuance of a licence and actual marriage.

It is not easy to guess how many couples dispense altogether with marital rites under the increasing pressure of regulation and the estimation of this result is made more difficult by the recent decision of New York State to allow no record of illegitimacy to be made in its birth certificates.

INTERNATIONAL CONFERENCE ON SILICOSIS

THE delegates to a conference on silicosis held early this month in Geneva under the auspices of the International Labour Office were able to arrive at agreement on many important issues. The conference, which was actually a meeting of the subcommittee on pneumoconiosis augmented by certain specially invited persons and several "observers,"[1] confirmed the definition of silicosis arrived at by the International Conference held at Johannesburg in 1930: a pathological condition of the lungs due to inhalation of silicon dioxide. The consensus of opinion was against the theory that dusts which do not contain silicon dioxide produce a typical pulmonary fibrosis. The admixture of other dusts with silica may indeed modify the effect of the latter, perhaps by depressing its solubility. It was accepted that the action of a dust containing silica depends in some way on its solubility though it may not necessarily be proportional to it. Once again it was made clear that coal dust is dangerous only in respect of the silica dust which is produced in the process of mining the coal. The influence of infection, especially tuberculosis, on the incidence and progress of silicosis was recognised, and one of the important recommendations likely to emerge in the report of the committee is emphasis on the value of a medical examination of candidates for employment in factories, foundries, or mines where they may be exposed to dust, with the main object of excluding those with pulmonary tuberculosis.

It was agreed that radiological diagnosis of silicosis cannot be established without the presence of discrete shadows indicating nodulation. The picture may, however, be greatly modified by coexisting infection. Biological tests to determine the presence of silica in the blood and excretions were held to be valueless in diagnosis, which must depend on history of exposure and clinical and radiological examination by experts. The question arose whether workers affected by uncomplicated silicosis should be compulsorily removed from dusty occupations. Doubtless the committee was influenced in its decision not to recommend this drastic measure by the many difficulties inherent in this question, and particularly by the fact that in a large proportion of cases the fibrotic process already initiated is not much affected by further exposure. The economic and psychological effects on a man forced out of employment, or compelled to change his work may indeed on the whole be more harmful than the continued exposure to dust.

It was noted that many improvements have been made in methods of dust sampling, and it was felt that the time has not yet come for recommending the use of any one instrument or method. For the present visible particles alone need be taken into consideration, since it is not known to what extent, if at all, ultramicroscopic particles give rise to fibrosis. In this connexion it was pointed out that the proportion of silica particles in the atmosphere does not bear a definite relation to the silica content of the rock or to the ratio of silica particles to others at the point of dust production.

It was noted that the degree of disability cannot be precisely assessed in terms of an arbitrary scale, and, though radiological evidence is essential to its determination, the incapacity is not necessarily proportional to the radiologically demonstrable changes in the lungs. Some reliable means of measuring functional respiratory capacity is much needed.

It was generally agreed that the coexistence of infection, especially tuberculosis, increases the disability due to silicosis.

As to direct means of stopping inhalation of dust, masks were favoured for use only where the dust cannot be otherwise controlled, since workers cannot be depended upon to keep them on, especially where they are working hard or under hot and humid conditions.

[1] The countries represented were: Australia (Dr. Charles Badham, Dr. W. E. George); Belgium (Dr. A. Langelez, Dr. Quinet, Dr. J. Van Beneden); Canada (Dr. A. R. Riddell); Denmark (Dr. Skuli Gudjonsson); France (Dr. G. Hausser, Dr. A. Policard); Great Britain (Mr. E. J. King, Ph.D., Dr. E. L. Middleton); the Netherlands (Dr. A. H. Vossenaar); Japan (Dr. Jisaku Tsukata); South Africa (Dr. L. G. Irvine, Dr. A. J. Orenstein); the United States (Dr. L. U. Gardner, Dr. L. Greenburg, Dr. R. R. Sayers). The Health Section of the League of Nations was represented by Dr. McKenzie and the governing body of the International Labour Office by Mr. J. Kitaoka, Mr. Ch. Tzaut, and Mr. G. Andersson.

SHEFFIELD'S NEW CONVALESCENT HOME

THE Zachary Merton Convalescent Home at Fulwood, which was opened last month, adjoins the Royal Hospital Annexe on Brookhouse Hill, and together they will form the nucleus of an auxiliary hospital to relieve the pressure on the beds of the city hospitals by allowing the transfer of early convalescent patients. The home was formally opened by Mr. R. M. Holland Martin, chairman of the Zachary Merton trust, which has borne the cost of building and equipment, some £23,500. This trust, which administers a fund of over £300,000 bequeathed by the late Mr. Zachary Merton, a London metal merchant, has now been responsible for the erection of similar homes in Manchester, Leicester, and elsewhere containing altogether nearly 700 beds.

IDEAL POSITION

The site of the home combines unusual accessibility to its base hospitals with truly countrified surroundings. Most convalescent homes are necessarily remote

The Zachary Merton Convalescent Home, Fulwood.

both from the hospitals with which they are connected and from the districts where their patients live. Here, however, the home lies within four miles of the centre of the town, from which buses and trams run to the very gate, so that friends and relations can pay their visits without hardship—a much-appreciated boon to those recovering from an operation or acute illness. This ease of access means too that patients can be transferred from the hospitals considerably earlier than if a long journey was entailed. At the same time the home is so placed that it might be many miles from any town. It looks out upon a pleasant valley stretching away to the Derbyshire moors, and this country land has been scheduled by the city as part of its green belt so that it can never be built over.

LAY-OUT

The home will accommodate 48 patients with the necessary nursing and domestic staff, and will be used too as a centre for the preliminary training of young probationer nurses in the years between leaving school and being accepted by a general hospital. The building is two-storeyed and forms three sides of a rectangle, with the open side to the south-west. The walls are faced with red rustic bricks, which are resistant to the well-known Sheffield grime, and the roof is of Westmorland green slates. The main wards for men and women are on the first floor. The ground floor of the main building is mostly taken up by day-rooms and rest-rooms, the former with french windows opening on to a terrace. A large loggia in each wing will provide fresh air and sunlight with shelter from the wind. The accommodation also includes a playroom for children, separate dining-rooms for patients and staff, and a bowling green in the grounds, and the home is connected by a glazed corridor with the Royal Hospital Annexe.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

BY "HAKIM"

IV

I ONCE heard a friend declare that every moment spent away from work was wasted; and he was not a dull fellow either. If a man, he said, is not thinking continually of his problems, he will do no good at them.

To the "pukka" scientist the problems of research may be absorbing; but the average doctor does not keep his professional problems—or his enthusiasms—behind a single frontier of the mind. "He works best who plays best" applies to many, if not to all.

I myself always enjoyed games and sports for themselves and not with any idea of their being good for me. I never could make out how some people manage to go on doing morning exercises in the bathroom. Does anyone, I wonder, still use dumb-bells? I once heard a well-known physiologist say that games were physical exercises under pleasant conditions.

Most of us agree with him that "physical jerks" and drill lose much of their value if they are disliked, and I imagine that to make physical exercises attractive to all is the principal problem in front of that new Government body with the cumbersome name of the National Council for Physical Fitness and Recreational Training.

* * *

India used to be—and I trust still is—a very pleasant land of recreation. I was pleased to hear from my son, a soldier recently returned from India, that Tent Clubs are again flourishing. In fact, he told me that little clubs near cantonments, half-forgotten and moribund since last century, are now revived, the revival being due, of course, to motor-cars and the increase of transport facilities generally. One good mark to motor-cars!

Several of the best pig-stickers of my time were Service doctors; not only those who rode in the classic event—the Kadir Cup—but civil surgeons in out-of-the-way stations. I was once a civil surgeon in the derelict Duars. That part of Bengal is no longer derelict, but some ten years before I was there blackwater fever had made it one of the most unwholesome places in the world. We had no regular Tent Club, but occasionally we stuck pig. Pig are ridden in "heats" of three spears, and the boar is counted prize to the first man who draws blood with his spear. A boar, like a fox when he first breaks covert, tends to make his point, to run straight for some definite spot known to him, in order to find sanctuary. The game is to press him at the start, and the beginning of a "ride" is a race to overtake him. If the boar finds himself being overtaken, and realises that he cannot make his point, he changes his tactics and starts to jink. Then is the time to ride cunning, for the last spear may be first when the quarry doubles back. When he is tired of being chased, and sees no way to safety, the boar loses his temper, and turns to bay. Then he is the most dangerous of animals, fighting mad, and ready to attack to the death.

I am not likely to forget my first boar. I was after him from the moment he had been spotted and we had the signal to ride, given by a look-out from the back of an elephant amongst the line of beaters, and I got a start of the other two men. My boar ran straight; he never jinked, for he knew—what I did not—a way to safety. But he lost his temper, and I should have known the signs. His little tail went up and up, and began to quiver. Galloping to the top of a rise in the ground he turned and stood. His little eyes were wickedly red, and his sharp tushes gleamed. I didn't like the look of him. From his vantage-point above me he charged. He leapt clean over my pony's rump, while I made a futile jab at him with my spear, and passed like a flash. Actually I was lucky. A charging boar can bowl over a man and horse by his weight alone; and his tushes, that are sharp as razors, can inflict terrible wounds. I started to follow again—the others had still not come up. Topping the rise, I found myself on the bank of the river which I knew must be close, for we were hunting in one of those wide river beds known all over India as "churs." I saw my boar. He had taken to water. It is said that a pig can't swim, but I can vouch for it that he can. I never saw him again.

* * *

We had many other amusements. The district was mostly planted with tea, and the planters were a cheerful crowd. They kept up about a dozen

polo grounds, and any civil surgeon who was keen, and had the ponies, could sandwich a bit of polo in between his medical inspections and visits. The game was played at one tea-estate centre on a Monday, at another on a Tuesday, and so on. We hunted mostly the common jackal, rarely the little light-coloured Indian fox that carries a black ring round his brush. To the remnants of a pack known as "bobbery"—composed of a mixture of breeds, mostly of the grey-hound type—I and a friend added some real fox-hounds. Eventually we had six couples of them. Drafted in couples as rejects from well-known Indian packs, such as the Peshawar Vale, they were not a level pack, and they were mostly mute. . . . But we taught the local Jack to run, and killed 42 of them in three months. I had bought the first couple, Rumour and Dewdrop, and they arrived and were let loose as my wife and I were having tea out of doors. We were not able to finish it—that was effectively done for us. My wife was kennel-mistress to me as joint master. We persuaded the Forest Officer, who was impervious to noise and smells, to let us wire in the space under his bungalow—one of those old-fashioned bungalows built on piles—and build the kennels there. It was sad to leave them for service elsewhere in 1914. When I said good-bye to the hounds I little thought I should never hunt in India again.

* * *

We did our bit of amateur racing, too; especially at the annual week of the local Volunteer Mounted Corps, in which I was a trooper; and there was tennis, golf, and, incidentally, tiger-shooting. I once shot a tiger in the near hind paw. As I was the first to hit him, he was adjudged my tiger, and his skin hangs now in my hall. The half-dozen or so European doctors in the district, who looked after the tea-gardens had unrivalled opportunities for shooting of both big and small game. There was certainly no lack of occupation in my day for the leisure hours when work was over in the "mofussil." Outdoor pursuits cost little in India then. I bought my first polo pony—he'd be almost as old as myself now if he were alive—for a sum of rupees equivalent to ten English pounds. I know that India, alas—unless, perhaps, for pig-sticking—is no longer a cheap land for those who, like myself, love horseflesh. And the best view in the world can be had from between the ears of a horse!

* * *

England is cheaper; indeed quite cheap for those who know, and are not ambitious to play polo and hunt with the top flight. All this season I have been playing polo with a young serving medical officer. It costs us each less to play three days a week for the whole short English season than it would to dine in town and do a theatre—with a girl friend—once a week. The same applies to hunting. English hunts are kind to the Services. It is difficult for a busy general practitioner, or for a London consultant, to get off for a whole day's hunting; but I meet a number of both kinds in the hunting field. Perhaps they hunt for their health's sake, but I like to think that they hunt because there are few emotions to compare with the feeling of a good horse between the knees, and a far-flung vista of fields and fences ahead. Golf is a good game, and doubtless health-giving. Being a Scot, I was brought up to it. Many doctors of my acquaintance, both young and old, play it. Some of them are even addicts. But in my experience it is not much less expensive than hunting; even if one has to pay full subscriptions, which most country doctors do not have to, and most consultants can afford. Septuagenarians, if they can ride, can hunt when they are past golf—except as rabbits—and the more strenuous games; for in hunting there is no strain on the heart. The horse does most of the work—the rider is being carried. If they are still practising, they probably go back to their work after a day's hunting more refreshed than after a game of golf—and the nineteenth hole.

India, I am told, still provides cheap facilities for the popular games—tennis, cricket, hockey, and golf; and though one can no longer wander out with a gun and get shooting within easy distance—ah, those cold weather mornings shooting black partridge in the elephant grass, or quail amongst the Indian corn—if one is ready to make a proper arrangement, good and inexpensive small-game shooting is still to be had. Big game is always more of a "bundobust."

If I have a nostalgia nowadays—it is for the feel of a Punjab cold weather morning, with its breath of an air like champagne, and the line of the snows faintly visible in the distance.

*** *This concludes the four articles by "Hakim." Next month A Voice in the Wilderness will be responsible for these columns.*—ED. L.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED SEPT. 10TH, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 1625; diphtheria, 1184; enteric fever, 36 (79 "expected"); pneumonia (primary or influenzal), 307; puerperal pyrexia, 141; cerebro-spinal fever, 17; acute poliomyelitis, 73; acute polio-encephalitis, 3; encephalitis lethargica, 5; dysentery, 33; ophthalmia neonatorum, 99. No case of cholera, plague, or typhus fever was notified during the week.

The incidence of poliomyelitis still remains almost stationary, the total poliomyelitis and polio-encephalitis cases combined being 76, 82, 76, 83, 87, 63, 41, 29 for this and the previous seven weeks (working backwards).

The number of cases in the Infectious Hospitals of the London County Council on Sept. 16th was 2451, which included: Scarlet fever, 465; diphtheria, 969 (carriers, 28); measles, 60; whooping-cough, 222; puerperal fever, 15 mothers (plus 7 babies); encephalitis lethargica, 274; poliomyelitis, 20. At St. Margaret's Hospital there were 19 babies (plus 10 mothers) with ophthalmia neonatorum.

Deaths.—In 126 great towns, including London, there was no death from small-pox, 4 (1) from enteric fever, 5 (0) from measles, 7 (2) from scarlet fever, 8 (1) from whooping-cough, 18 (4) from diphtheria, 48 (9) from diarrhœa and enteritis under two years, and 9 (2) from influenza. The figures in parentheses are those for London itself.

Portsmouth, Southampton, Blackpool each reported a case of typhoid. Two fatal cases of measles occurred at Leeds. Fatal cases of diphtheria were scattered over 13 great towns, 2 at Blackpool. Birmingham had 9 deaths from diarrhœa, Liverpool 4, Portsmouth, Leeds, and Middlesbrough each 3.

The number of stillbirths notified during the week was 247 (corresponding to a rate of 38 per 1000 total births), including 38 in London.

SOCIETY FOR THE STUDY OF INEBRIETY.—On Tuesday, Oct. 11th, Prof. Edward Mapother will deliver the seventeenth Norman Kerr lecture to this society in Friends House, Euston-road, N.W. His subject will be the physical basis of alcoholic mental disorder. Tea will be served at the Cora Hotel, Woburn-place, at 3.30 P.M., before the lecture.

CORRESPONDENCE

TREASURY AID FOR THE TEACHING HOSPITALS

To the Editor of THE LANCET

SIR,—It is now fairly common knowledge that many of the large teaching voluntary hospitals, both in London and the provinces, are experiencing considerable financial difficulties. It is less widely known that some of them, as you state in your issue of Sept. 10th (p. 632), are now "considering the question of applying for State assistance in some form." Such an application would presumably be based on the grounds that the cost of hospital maintenance is higher in institutions in which the staff undertakes education and in some cases research work. Such a contention is probably sound in the main, though it might be difficult to support it with any definite itemised accounts for "teaching costs." Those in control of King Edward's Hospital Fund have long scrutinised the hospitals' balance sheets with an eagle eye for details of that kind. There can, I think, be little doubt that expensive facilities such as X ray and laboratory departments are used, and indeed should be used, more freely where modern medicine is being taught and investigated than where it is being merely practised. In the Hospitals Year-Book, 1938, issued by the Central Bureau of Hospital Information, the tables showing the average cost of each in-patient per week in general hospitals for the year 1936 record some figures which may be relevant. For example, in only 2 out of the 12 London hospitals which had undergraduate medical schools in 1936 was the total weekly cost of each in-patient less than £4, whereas in only 2 of 13 large voluntary hospitals (over 150 beds) was it over £4.

The problem, however, that now confronts those responsible for medical education is a much broader one than the mere finding of relief for governing bodies harassed with the task of finding ordinary, or even perhaps rather more than ordinary, hospital supplies. It is essentially the provision of proper facilities for carrying on clinical education and research at standards that can reasonably be expected in university medical faculties teaching some eleven thousand students and supplying practitioners to some forty million people.

The progressive failure of the voluntary system, even in the very diluted form in which the King's Fund and the various contributory schemes have left it, makes it necessary to review the entire basis of the finances of teaching hospitals. The allocation of greater proportions to pay-beds, small or even substantial economies on desirable expenditure, and continual appeals to a more and more sceptical public may satisfy the needs of the ordinary voluntary hospitals, but they cannot provide any permanent financial foundation for hospitals concerned with an essential public service like medical education.

I believe that the time has now come for those concerned with medicine as a whole in this country—

(*a*) to accept medical education and research as the principal object of this small but indispensable group of teaching hospitals;

(*b*) to place these hospitals in their proper position as integral parts of the existing university medical schools—viz., as providing in the second half of the curriculum facilities for training that are complementary to those afforded in the first half in the present medical school laboratories;

(*c*) to realise that incomes from endowments, voluntary donations, and patients' contributions are no longer sufficient to carry a burden part of which results from the utilisation of these hospitals as educational centres, and consequently that additional funds must be found if the teaching hospitals are to maintain satisfactorily a service that is national in its scope.

In laying the difficulties of the teaching hospitals before the State department, the lead appears to be coming from the hospital side, and in their endeavour to balance their accounts some of these institutions are hastening into actions that must gravely jeopardise medical education in the future. It is time that the university teachers, who are collectively responsible to their universities for medical education, should consider their position in this matter and how far gradual encroachments on traditional facilities are interfering with the duties they have undertaken to fulfil. Concern at the present tendencies is, I believe, widespread among university teachers, and many of them feel that the universities themselves should have a greater share in the control over the entire resources for the teaching of their students, and should no longer rely on institutions many of which are coming more and more under the control of bodies that have no direct, and apparently very little indirect, interest in medical education.

Should the State department that may be concerned with any appeal from the teaching voluntary hospitals decide to help these institutions, and to help them on the ground that they are providing for teaching of national importance, it is to be hoped that they will fully canvass the views of the university teachers before they take any action. It is also to be hoped that the university teachers themselves will take steps to express their views on a matter which is of the greatest concern to them.

I am, Sir, yours faithfully,

G. PAYLING WRIGHT.

27, Gordon-square, W.C.1, Sept. 15th.

THE ARCHES OF THE FOOT

To the Editor of THE LANCET

SIR,—If I have said that the normal human foot should have no arch at all in the sense of a permanent fixed anatomical structure, I have never said or implied that the normal foot is structurally built in the form of a completely flat foot, and I should have been astonished if Mr. Bruce and Dr. Walmsley (*Lancet*, Sept. 17th, p. 656) had found such a condition in a fœtus or in a new-born child. When a joint or a series of joints has a wide range of normal movement, one would expect its anatomy to be disposed about an intermediate position and not to be adapted to one of its extremes. I have no doubt that the normal foot when at rest and free from weight-bearing (and also when dead) falls naturally into a position in which there is a moderate longitudinal arch. But it is the *fixation* of this arch and the consequent inability of the foot to yield without encountering resistance and strain that we regard as unnatural. As you rightly say in your leading article, it is the mobility of the arches that is of most importance.

I would not labour this point were it not for the unfortunate conclusions that have been arrived at by Bruce and Walmsley as the result of their anatomical studies. They conclude that manipula-

tion is contra-indicated in cases of longitudinal foot strain, and that "the proper measures appear to be an improvement in the muscle tone of the foot by an appropriate mixture of rest and exercise, together with some adjustment of the load by regulation of the body-weight, and its partial deflection to the outer side of the foot by raising of the inner part of the sole." And so we come back to flat-foot exercises, valgus pads, and wedges—the standard treatment which I was taught when I began to do orthopædic surgery, which has been employed by orthopædic surgeons for generations, which has proved a miserable failure in practice, and which has driven thousands of dissatisfied patients into the hands of the bone-setter who has promptly cured them by manipulation.

The proper treatment of foot strain is manipulation followed by massage and exercises. First make the foot supple and painless, then make it strong.

I am, Sir, yours faithfully,

A. S. BLUNDELL BANKART.

London, W., Sept. 19th.

To the Editor of THE LANCET

SIR,—Mr. Bruce and Dr. Walmsley state that I regard the longitudinal arch as a "deformity." Since one sentence in the paper they quote (*Brit. med. J.* 1933, **2**, 536), when taken out of its context, might be interpreted as having this meaning, I would be grateful for the opportunity to correct it.

The normal foot is a supple structure in which it is possible to vary the height of the arch at will, although it is customarily used at a particular height that differs with the individual. This is easily demonstrable by anyone with a normal foot. I have discussed the mechanics in detail in THE LANCET (1934, **2**, 1089).

The situation is comparable to that in the spine. Viewed in the sagittal plane, the spine is often held straight, but a lateral curvature can be produced voluntarily and many people will frequently assume such a posture when standing relaxed. However, when a person always stands with a lateral curvature but can voluntarily correct it, there is said to be a postural deformity; if the curvature cannot be corrected, there is a fixed deformity; and the spine is also abnormal if it is fixed straight. Likewise with the foot: it has a posture in which it is normally used, but it can relax into a "flat" position; however, there is a postural deformity if it is habitually held "flat" and a fixed deformity if the foot loses its suppleness and becomes fixed in any position, whether flat or arched. Treatment by manipulation is used in some cases of painful feet to restore lost mobility, not with the intention to "obliterate the arch completely."

Bruce and Walmsley are to be congratulated on their embryological study of the foot. In particular, their observations on the posture of the metatarsal heads are a valuable confirmation of the view held by most orthopædic surgeons, at any rate in London, that the "anterior arch" does not exist. Their deduction as to the cause of pain in anterior metatarsalgia is, however, open to criticism. They state that the scientific and accurate explanation for the pain in anterior metatarsalgia is strain of the transverse ligaments of the metatarsal heads. It would be interesting to know the evidence on which this statement is based. The pain cannot be produced by pulling the 1st and 5th metatarsal heads apart, as might be expected if their theory is correct. The pain is in the metatarso-phalangeal joints: it can be produced by passively flexing the toes and by pressure on the plantar aspect of the joints rather than between them.

I am, Sir, yours faithfully,

Harley-street, W., Sept. 19th. PHILIP WILES.

To the Editor of THE LANCET

SIR,—Reference is made by Mr. Bruce and Dr. Walmsley to the lumbrical interosseous system of the forefoot. I have occasionally had opportunity to observe the effect of the loss of these muscles in the hand from combined partial median and ulnar nerve paralysis of traumatic origin. The features met with can there be studied in a pure form, and serve to substantiate the description given in the paper of the effect of failure of the system in the forefoot. In the case of the hand the metacarpo-phalangeal joints are hyper-extended. The patient cannot exert the proper function of grasp, or oppose the tips of the fingers and thumb. If he is asked to grasp a large or a small object, the fingers simply curl up into the palm. If now the examiner grasps the metacarpo-phalangeal joints and holds them firmly forward in semi-flexion, the patient can grasp and oppose quite strongly. It is to be noted that the lumbrical and interosseous muscles to the digit must both be paralysed for these features to be present. For normality in the forefoot, therefore, the tonus and contraction of the lumbrical and interossei muscles are necessary for the long flexor muscles to make the extended toes "grasp" the ground, and so spare the metatarsal heads from repeated minor trauma in weight-bearing and progression. Shoes that are too short must interfere with this function because the foot lengthens when it bears weight. The proper length of shoe must therefore be estimated in the weight-bearing foot.

May I be allowed to emphasise the importance of appreciating that faulty function and deformations of the foot are very commonly related to bad mechanics and posture of the body as a whole. Often the main factor needed for their cure is special attention to the physical education of the patient. The patient's active coöperation should be enlisted in a sustained effort to stretch the body up as tall as possible with the toes pointing forwards, the heels resting lightly, and the longitudinal arches consciously elevated. The patient's head often requires far greater attention than his feet, for two reasons: (1) because it is the position of the head that enforces a right or wrong position of the body as a whole, and therefore of the foot; and (2) because success in treatment depends on what the surgeon can cause to go on *inside* the patient's head in the way of determination to establish a state of right use of his antigravity muscles. After all, a large part of the success in dealing with orthopædic cases is psychological. The patient's muscles are under his own control, and his will and desire to use them effectively must be awakened and fostered. In young children one cannot make such a direct appeal to the intelligence, but they readily respond to simpler methods to ensure good habits of bodily posture. It is the position of the foot and of the body in the long hours between strengthening exercises that determines whether the instruction is effective or not. The surgeon must infect the patient with his own enthusiasm. The implications of this in relation to the need for orthopædists to interest themselves in the physical education of our people must be obvious to all, for they should be expert in all phases of the correct way to ensure proper correlation of the structure and function of the body and all its parts relative to the spine and limbs.

Bruce and Walmsley begin their article by saying that flat-foot is generally regarded as one of the less inspiring and more commonplace of structural imper-

fections. If a broader view is taken, and signs are not wanting that it is being adopted, I submit that orthopædics can be a fascinating subject to all who practise it. Whether it be the foot, knee, hip, spine, or shoulder we are dealing with, let us regard it not only or always as a local problem susceptible of local and externally applied adjustment but as a part of a larger problem, often bound up with the correct use of the body as a whole, and requiring the help of the patient in its solution. If this understanding can be reached I feel confident that the treatment of orthopædic cases will have a better chance of being well conceived.

One who practises orthopædics should be fired with a positive ideal and knowledge of what correct use of the body really means. He should be trained to rectify not only the pathological deformities but also the physiological deformities of mankind. This will mean, among other things, that matters relating to muscle tone, balance, control, and re-education will be his primary responsibility and not that of those to whom he may choose to delegate such duties.

I am, Sir, yours faithfully,

Edinburgh, Sept. 18th. W. A. COCHRANE.

To the Editor of THE LANCET

SIR,—The reference in your leading article last week to correct foot-wear, as described by Mr. Creer, has set me wondering once more about the effect of wearing sandals. The backless type of sandal so much in vogue as holiday wear for girls and young women certainly does not grip the heel and often gives little or no support to the instep. It is probable that the foot strengthened by barefoot exercise would tolerate the lack of support very well, but the majority of the wearers of sandals must be accustomed to the imperfect constrictive foot-wear, often with high heels, described in your article. Do their transverse arches not spread when exposed to the strain of wearing backless sandals, and is there not an increase in their foot troubles during the later months of the year? I have formed a definite impression that the feet of some children lose their narrow, elegant shape after they have worn sandals for some time.

I should also like to know whether Mr. Bruce and Dr. Walmsley, in their reference to obliteration of the longitudinal arch, mean an attempt at *permanent* obliteration. In mobilising the arch one does temporarily obliterate it, but with the expectation that it will re-form by muscle action.

I am, Sir, yours faithfully,

A. H. BAKER.

Upper Wimpole-street, W., Sept. 18th.

MUSCLE RECOVERY IN POLIOMYELITIS

To the Editor of THE LANCET

SIR,—Much is being written on acute poliomyelitis, but none of the recent communications in THE LANCET has included the degree of muscle recovery studied in any large group of cases of this disease. The question continually asked by the relatives of these unfortunate patients is what ultimate degree of muscle recovery may be expected, with modern methods of treatment, after the defervescence of the fever and the subsidence of the acute reactionary changes. The answer can only be indicated by the study of a large number of cases of different degrees of severity at varying periods during their long convalescence. Information on this aspect of the disease would be of great value to the general practitioner.

I am, Sir, yours faithfully,

London, S.W., Sept. 17th. L. T. POOLE.

TREATMENT OF INFANTILE PARALYSIS BY CONVALESCENT SERUM

To the Editor of THE LANCET

SIR,—I am very glad that Prof. Bedson is interested in this subject, but I am sorry that he takes the prevalent negative attitude. My hope was that authorities such as he would agree that serum has not yet been tried exhaustively. This is the opinion of Prof. A. D. Gardner after a review of the literature.

Before the profession withholds convalescent serum further trial seems advisable, and to my mind intensely desirable. After all, the serum used in the negative trials has often *not* been derived from fairly recent convalescents from unquestioned anterior poliomyelitis (A.P.M.), has *not* been free from antiseptic, has *not* been given without post-puncture delay, and has *not* been used in ample dosage.

Prof. Bedson quotes W. A. Park (1932), but in this series the serum-treated cases and the controls were not truly comparable. Furthermore, if the deduction from this trial is negative, it applies only to the use of serum as then prepared and administered in New York. On the other hand, F. W. Jackson and C. R. Donovan reviewing the 1936 epidemic of poliomyelitis in Manitoba (*Canad. publ. Hlth J.* 1937, **28**, 363 and 368) give the following table:—

END RESULTS OF 131 CASES WITH POSITIVE SPINAL FLUID FINDINGS

Result.	Serum administered within 36 hours of onset.	Serum after 36 hours; or after paralysis; or not administered.
	Cases.	Cases.
Recovered without paralysis	51 (92·7%)	43 (56·6%)
Recovered with residual paralysis	3 (5·5%)	28 (36·8%)
Died	1 (1·8%)	5 (6·6%)
Total	55 (100%)	76 (100%)

With regard to the route supposed to be taken by the virus—i.e., from olfactory hairs via nerve-cells and their axons to the anterior horn cells—the spinal sign and cerebro-spinal fluid evidence of meningeal irritation are to be discovered commonly, if not invariably, 24 hours or more before the virus disables the cells. It would therefore appear likely that by intravenous injection of adequate doses of immune serum the horn cells could be supplied with passive immunity before the arrival of the virus. Prof. Bedson makes the point that the virus cannot be reached by the serum while it is passing through a cell or its axon. But there must be several interdentritic passages, and the signs of meningeal irritation suggest that the virus is not completely shut off, and therefore not safe from the action of tissue fluids. Furthermore, if the horn cells are protected by immune bodies when the virus reaches them it will reach them in vain. Neither statistics nor theory is conclusive. There is ground for an appeal and a further trial.

I have been asked how a doctor is to recognise preparalytic A.P.M. The period of the year, and the existence of a local epidemic, may be suggestive. The child has, or has recently had, a brief feverish illness, commonly pharyngitis. All such patients should be taught to give their knees a "Good Morning" and "Good Night" kiss. During the fever, or associated with a secondary rise, the patient complains of stiffness in the neck or back, and when

asked to carry out the morning and evening kissing of his knees cannot do so. A.P.M. is suspected, *the patient is not moved*, but with the least possible delay pathologist, serum, and microscope are brought to his bedside; lumbar puncture is carried out, 5 or 10 c.cm. are withdrawn, and the needle is left in situ while the fluid is examined. At this stage the characteristic "Polio" finding is a *raised cell count (polymorphs and mononuclears) in a clear or slightly opalescent fluid*, and there is usually some increase of pressure. Should there be need to distinguish A.P.M. from tuberculous meningitis the chlorides will be found unreduced in the former. If the clinical and cerebro-spinal fluid pictures agree, about 10 or 20 c.cm. of serum at body temperature is slowly injected intrathecally, the main dose being intramuscular or intravenous. The dose is related to the size of the patient. In 12-year-olds I have used 50 to 100 c.cm., but I now feel that 200 c.cm., or even more if the illness is severe, may be advisable.

I am, Sir, yours faithfully,

Oxford, Sept. 19th. G. R. GIRDLESTONE.

KETONÆMIA IN DIABETES AND PREGNANCY

To the Editor of THE LANCET

SIR,—The article by Dr. Gray in your last issue gives a misleading interpretation of our paper on the causation of diabetic coma. Our cases were deliberately selected to bring forward the exceptional instances where ketosis did not go hand in hand with clinical severity. We were concerned solely with the question of ætiology and not with assessing prognosis.

It has been known since 1857 that ketonæmia and ketonuria are very often present in diabetes and diabetic coma, and as early as 1860 the suggestion was made that the coma is due to the accumulation of acetone bodies (aceto-acetic acid, β-hydroxybutyric acid and acetone). Since these early observations the findings have been confirmed repeatedly by many workers, including ourselves. Every student is taught the causal relationship that exists between diabetic coma and a urine that gives a port-wine colour on the addition of ferric chloride.

From time to time, however, numerous cases have been reported of diabetic coma without ketosis, and as a result other causes for diabetic coma have been sought; these include crotonic acid, butyric acid, a polypeptide, an unknown toxin, and a simple acidosis. In our paper (1930) these views were discussed, and, in support of some other cause of coma than aceto-acetic acid or β-hydroxybutyric acid, 7 cases were *selected* from a series of cases of diabetes that had been studied. In these 7 selected cases the acetone bodies bore no relationship to the clinical state of the patient, findings which were in agreement with other reported cases. It must not be inferred, however, as Dr. Gray has done, that we believe that all cases of diabetic coma fall into this group. The cases we selected were examples of diabetic coma the onset of which could not be explained by the intoxication theory of aceto-acetic acid. The seventh case was a most interesting one. On a controlled diet with 50 units of insulin the patient was sugar-free with a resting blood-sugar of 135 mg. per 100 c.cm., and a normal blood-acetone content. After insulin was stopped and the diet was no longer restricted the blood-acetone bodies varied from 64–156 mg. per 100 c.cm., and the blood-sugar from 270 to 500 mg. per 100 c.cm., while the urine showed a strongly positive Gerhardt, and as much as 11·7 g. of sugar per 100 c.cm. She did not go into coma, yet the amount of acetone bodies in her blood exceeded that observed in many cases of diabetic coma. Such cases are not common but several have been reported by Frerichs, Von Jaksch, Albertoni and Pisenti, among others.

In conclusion it may be said that whereas in most cases of diabetes the appearance of aceto-acetic acid in the urine and blood in increasing amounts warns us of the danger of coma, experience of other cases suggests that the accumulation of ketone bodies does not adequately explain the *ætiology* of coma, with which our paper was solely concerned.

We are, Sir, yours faithfully,

E. C. DODDS,
J. D. ROBERTSON.

Courtauld Institute of Biochemistry, Middlesex Hospital, Sept. 19th.

MATERNAL MORTALITY AND MEDICAL EDUCATION

To the Editor of THE LANCET

SIR,—The question whether the midwifery of the future shall be domiciliary, with the general practitioner as the key-man of a team, or institutional, with his practical elimination, is of such importance to the profession and to professional education that I would ask your permission to discuss in a final letter this abstract issue, separated from all personal or political considerations.

The death-rate from maternal accidents and disease has remained disappointingly high notwithstanding much strenuous effort to improve it. A welter of reports by Parliamentary and other committees has been furnished, especially during the last decade; one of the most weighty of these is the "Report on Maternal Morbidity and Mortality in Scotland," published in 1935 by two medical officers of the Scottish Department of Health. This report received enhanced authority from the endorsement of its essential recommendations by the scientific advisory committee of the same Department (1936, Cmd. 5204) and it formed the basis of the important debate in the House of Commons on Jan. 28th, 1937, to which I have referred. The high maternal mortality-rate in Scotland, estimated at 6 per 1000 when the corresponding rate in England and Wales was only 4 per 1000, explains the special and sustained activity of the Scottish authorities. Unfortunately no satisfactory data are forthcoming to determine whether the rate is higher in domiciliary or institutional cases. It is constantly assumed that the rate is lower with institutional treatment—i.e., delivery effected in maternity hospitals—but Prof. Graham Kerr, F.R.S., M.P. for the Scottish universities, and a conspicuously careful and skilled observer, quoted some figures from a report published in New York in 1933, dealing with 348,310 cases, which showed that while the death-rate in "splendidly equipped hospitals" was 4·5 per 1000, the rate for domiciliary confinements was only 1·9 per 1000 (Hansard, Jan. 28th, 1937). The Scottish report of 1935 is excellently summarised and commended in the report issued a year later by the Scottish Department of Health (Cmd. 5204, p. 177). The gist of the recommendations is contained in the following sentences: "Maternity service should be based on the doctor and midwife, acting in concert, supplemented by consultants and institutional facilities." "More practical training of doctors and midwives, along with other measures, are required to raise the general standard of midwifery practice." "Antenatal, intranatal and postnatal supervision should be afforded by the same medical attendant"—i.e., by the general practitioner. The General Medical

Council, after prolonged deliberation, stimulated by recommendations from the licensing bodies in London and the Universities of Oxford, Cambridge, and London, has made alterations in the curriculum which require a much more intensive training in midwifery for the future practitioner, in the confident expectation that the system of team-work cited above will remain the basis of future midwifery practice. If this expectation is defeated—and the present trend to extend institutional treatment threatens this consummation—that painful effort to improve the education of the general practitioner in midwifery may as well be abandoned, for it will no longer be called for. Unless immediate, energetic, and authoritative opposition on the part of the profession is offered to this trend, the final victory of institutional as against domiciliary midwifery cannot be in doubt. "You have been warned."

I am, Sir, yours faithfully,

Ramsgate, Sept. 18th E. GRAHAM-LITTLE.

PS.—Since writing the above I have seen my friend Miss Fairfield's letter. I have obviously grievously under-estimated the present activity of the L.C.C. in the field of midwifery. The figures Miss Fairfield gives indicate that the menace, as I regard it, of universal institutional treatment superseding domiciliary treatment is even nearer fulfilment than I represented.—E. G.-L.

SURGICAL HANDBOOK FOR HOSPITAL ASSISTANTS IN THE TROPICS

To the Editor of THE LANCET

SIR,—For an author to have his book reviewed in the authoritative pages of THE LANCET is a great privilege, but is also an ordeal, and an unfavourable review can be very damaging, both to the sales of the book—which is a small matter—and to the author's professional reputation—which is vitally important. While, therefore, I am grateful for the space allotted to my "Surgical Handbook for Hospital Assistants in the Tropics" in your issue of August 6th (p. 317), I cannot but feel upset and humiliated at the manner in which your reviewer has misrepresented many statements in my book. I am quoted as offering, on p. 22, the advice to "amputate in all cases of suppurative knee-joints." Any surgeon who gave such advice would, of course, deserve to be struck off the Register. Reference to my book, however, shows clearly that I was advising amputation only in cases of suppurative arthritis which had resulted in pyæmia. I am represented as advising, on p. 47, the free exhibition of alcohol in cases of diabetes and kidney disease; whereas the truth is that I was recommending its use in the treatment of carbuncles. Your reviewer comments that the method which I recommend, on p. 276, of "driving the pin through the bone by blows of a hammer when transfixing the os calcis is out of date." In this he displays a really remarkable ignorance of modern fracture methods. Prof. Böhler (whose clinic I recently had the pleasure of attending), and many other authorities, *invariably* transfix bone by means of hammer blows, the reason being that this is the only method which will ensure the pin being tightly gripped by the bone which it transfixes. Working the pin through by manual rotation has been abandoned because a pin so passed was found to lie too loosely in the bone, and the slight movements which resulted from its incomplete fixation were found to cause irritation and sometimes a definite osteomyelitis. This is a point on which Böhler is insistent. I am criticised for "omitting to mention blackwater fever in the chapter on hæmaturia." If your reviewer *really* believes that blackwater fever is a cause of *hæmaturia*, further comment on my part would be a mere waste of time. The advice that "Evipan should find a place in the chapter on anæsthesia" will find few supporters amongst tropical surgeons who have, like myself, had practical experience of this drug. In this connexion, the remarks of R. H. Micks on p. 104 of "The Essentials of Materia Medica, Pharmacology and Therapeutics" (1938) will help to disillusion those who think that the intravenous administration of an unstable barbiturate (in a country where livers are constantly subject to amœbic and helminthic injury) may safely be entrusted to African dispensers.

I am well aware of the fact that "ether is a much valued anæsthetic in the highlands of Kenya." I have seen it admirably administered, intratracheally, in C. V. Braimbridge's clinic at Nairobi, and have myself frequently employed it in Dar-es-Salaam. It is, however, too expensive for general use throughout tropical Africa. Apart altogether from this consideration, the fact should be emphasised that, for some reason which I do not pretend to understand, "open" $CHCl_3$ is amazingly free from risk in the hot, moist parts of the world. Throughout my 18 years of surgical work in the tropics, during which period I have performed many thousands of operations of all grades of severity, under open chloroform, I have had but two anæsthetic deaths and not a single case of delayed chloroform poisoning.

I am, Sir, yours faithfully,

W. K. CONNELL,

Sept. 9th. Surgical Specialist, Tanganyika Territory.

*** In our review, besides suggesting that a few dogmatic statements would be better if they had been qualified, we commended Mr. Connell's book as likely to provide an invaluable vade-mecum for hospital dressers and dispensers, and a great help to the medical officers who have to teach them.—ED. L.

PEMPHIGUS TREATED WITH M. & B. 693

To the Editor of THE LANCET

SIR,—Last week I asked your readers to take note of my experience of Prontosil Album in the treatment of facial carbuncle and lupus erythematosus. I would now like to bring to the notice of fellow dermatologists and others the remarkable effect of the allied drug M. & B. 693 on a severe case of pemphigus at present in Guy's Hospital under my care. I am not suggesting that the patient is cured; he may relapse and the drug may cease to have any effect. My reason for writing about the case thus prematurely is that severe generalised pemphigus is one of the most distressing and horrible diseases, and those medical men who are unfortunate enough to have a case under their care may be glad to try the drug, even if the relief that it affords proves to be only temporary. I should be grateful if any who do so would let me know personally of the results.

My patient, a middle-aged man, was admitted to Guy's several weeks ago. He had previously seen Mr. Mollison, who had diagnosed pemphigus of the buccal mucous membrane, and when I saw him the skin was extensively involved. He was first given injections of Germanin without any apparent benefit. He became progressively worse, and developed the depressed, almost maudlin state of mind that usually heralds the end in these cases. Dr. David Erskine, who has had great experience of M. & B. 693 in gonorrhœa, and I then decided to try the effect of

this drug, and at first it was given both by injection and by mouth. The patient's condition rapidly improved until the greater part of the eruption had disappeared both from the skin and mouth. Fearing toxic effects from the drug, we omitted it, and new bullæ began slowly to appear again, but his general condition remained good. I then gave the drug again by mouth only, with immediate improvement, and very shortly his skin cleared completely once more except that a few bullæ continued to appear on the feet. The drug was omitted again and he remained almost free from blisters for about ten days when some new ones appeared in the mouth. As his blood count was normal, except for some eosinophilia, the drug was given again by mouth with immediate improvement.

Whether a cure will ultimately be effected is doubtful, for in my experience pemphigus is a fatal disease, but no treatment that I have employed in other cases has had a result at all comparable with this.

I am, Sir, yours faithfully,

Devonshire-place, W., Sept. 19th. H. W. BARBER.

ANY DOCTOR'S SERVICE IN EMERGENCY

To the Editor of THE LANCET

SIR,—I would like to support your suggestion that some steps should be taken to educate those medical men who know themselves to be deficient in the knowledge of the treatment of casualties.

I am, Sir, yours faithfully,

Harley-street, W., Sept. 20th. H. M. WORTH.

THE USE OF SUGAR AS A HÆMOSTATIC IN TONSILLECTOMY

To the Editor of THE LANCET

SIR,—The arrival of a trade circular introducing "a new hæmostatic" which owes its action to its pectin content, prompts me to relate my experience with substances of this nature. As every laryngologist knows, the best hæmostatic is a pair of artery forceps and the best means of avoiding post-operative hæmorrhage is to satisfy oneself that each tonsillar fossa is dry before the patient leaves the operating table. Personally I find it necessary to apply ligatures in only 10 per cent. of tonsillectomies in adults, but some surgeons tie vessels in every case. All are agreed, however, that in certain cases there is no definite bleeding point, but a diffuse and steady ooze, apart altogether from such conditions as hæmophilia. It is for this type of case that a local hæmostatic is demanded, and is employed as a routine by many surgeons. Turpentine and also perchloride of iron solution are old favourites but tend to increase the pain. A mixture of aspirin and tannic acid is favoured by some, as is also peroxide of hydrogen. The disadvantage of all these applications is that they do not adhere to the cavity, so that their action is only temporary.

The search for some sticky substance having local anæsthetic and hæmostatic action led me to try the effect of carbolised resin and I used this for about ten years with excellent results. In 1933 my attention was drawn to a paper published in THE LANCET (1932, **2**, 1272) by Dr. John Eason advising the use of glucose solution in cases of gastric hæmorrhage, a method of treatment still employed in his wards at the Royal Infirmary of Edinburgh. It occurred to me that glucose might be a useful hæmostatic in tonsillectomy and indeed it proved so satisfactory that I adopted it in place of carbolised resin which had the disadvantage of being difficult to remove from instruments. For the last two years I have employed a well-known brand of fruit pectin which is used in the making of jams and jellies and which is even better than glucose as a hæmostatic. It is applied on a small swab, which is placed in the tonsil cavity and allowed to remain there for 3 or 4 minutes. The exact mode of action of sugar and pectin solutions as hæmostatics is not clear. Probably the action is purely mechanical, the sticky medium assisting coagulation of the blood. My experience of such hæmostatics is limited to tonsillectomies, but good results might also be obtained in epistaxis, after tooth extraction, and in other forms of capillary hæmorrhage. That trivial, though most annoying, injury, the shaving cut, responds immediately to the treatment.

It would be interesting to hear the opinions of any of your readers who have had experience in the use of local hæmostatics of this nature.

I am, Sir, yours faithfully,

Edinburgh, Sept. 15th. DOUGLAS GUTHRIE.

MEDICINE IN REPUBLICAN SPAIN

WE have received a further letter from Dr. R. S. Saxton, a member of the British Ambulance Unit of the Spanish Medical Aid Committee:—

It may be of interest to your readers to hear of the sort of life a doctor has had during the last two years in Spain. Joining, at Grañen, the first British medical unit sent out by the Spanish medical aid committee, in September, 1936, I immediately found myself in conditions completely different from those which I had previously experienced. Though the staff was mostly British, the hospital was in an indescribably filthy state and, in the absence of other work, we could always clean and clear it. Most of the work came in rushes, corresponding to military activity on that sector of the front. Having only two operating-rooms and some 30 beds, we evacuated at the earliest moment all cases and only took in the most severely wounded. My chief recollections of the work were of the high mortality of penetrating head wounds, and of the value of pre-operative blood transfusion in cases of intestinal perforation (by bullets), and of many weeks treating the ulcers of the feet of refugee civilians who had walked from their villages in the mountains.

Towards the end of 1936 we moved to a position north of Madrid where we dealt with large numbers of seriously wounded from the International Brigade. Here impressions were mainly of the excellent results of the modern methods of treatment of broken limbs. Dr. Tudor Hart showed conspicuous skill in the use of Böhler's apparatus and in the application of the skin plaster. One great enemy was gangrene. Gas gangrene was common enough, but gangrene due to the failure of the local circulation was also observed. To watch for its appearance, and to treat it rapidly and radically, is more than a daily duty. The serum appears to be entirely antitoxic, so that while it allays suspicion by delaying the general signs of gas gangrene infection, the local disease goes on apace. Without repeated observation, this valuable serum can become a menace to the life of the patient.

TRANSFUSIONS

In February, 1937, we went to a village on the Madrid-Valencia road where, incidentally, we first experienced night air raids. Here we had an immense number of serious cases from the battle of the Jarama, and it was decided that blood transfusion was so important that one doctor should specialise in that work, if necessary, to the exclusion of all else. The lot fell to me. We had no transfusion syringes and no

satisfactory needles, but I collected two sets of instruments to enable me to dissect a vein and insert a cannula. The blood was poured into a funnel, and led by a rubber tube to a cannula. Later we also acquired a Jubé two-way syringe, and found work much simplified by being able to dispense with the funnel and puncture the veins in 95 per cent. of cases with the excellent trocar and cannula supplied. The blood sent from Madrid was of groups II and IV, and one could give blood of the correct group to 80 per cent. of patients. The refrigerator held up to 20 half-litre bottles, and we never ran out of stored blood in the hospital, and never needed to use the staff as donors.

Later on when the work became mainly medical the commonest diseases met with were influenza, bronchitis, dysentery and similar intestinal disorders, and venereal disease. Malaria and phthisis were not rare. In all the hospitals that we formed we constantly had to struggle to get sufficient material. The loss and destruction of supplies was also great in the journeys over, at best, indifferent roads; the hurried packings and moves, and the aerial bombardments. More than one of our operating tables has been hopelessly twisted by a bomb. We ourselves have lived under the most uncomfortable conditions: many have died or been wounded. We have lived in the most varied climates, slept anywhere, eaten what we could get, usually sufficient in quantity but invariably poor in quality: no butter, no fresh milk, few vegetables or eggs, little fresh meat, in fact hardly anything but beans, chick-peas, and dried codfish. We have had large numbers of pests: mosquitoes, flies (many of which sting), fleas, ants, and at lest two kinds of body lice; but worse than all, aviation.

In July, 1937, we received vast numbers of wounded from the battles that raged around Brunete. I once more took to transfusions, now as a whole-time job. We had a large hospital with five surgical units, two of them English. Here we gave transfusions so often, and sometimes in such quantity, that the supply from Madrid often ran out, and I was obliged to take blood from the already overworked staff. Here we learned to give intravenous salines, as well as blood, to the seriously wounded, and found great benefit from up to 800 c.cm. of 30 per cent. glucose saline with insulin (1 unit per 3 grammes of glucose). Others have found intravenous saline containing one-sixth of a grain of ephedrine useful in surgical shock. When using the donors on the staff, we have always given the blood as a direct transfusion—i.e., from arm to arm, using some kind of two-way syringe. This is a relatively quick and satisfactory method, and if the patient is coöperative can be carried out, if necessary, without an assistant of any description. It is always preferable to have someone at hand, however. Various kinds of syringe were used, usually the Jubé, but these were often disappointing on account of clotting. Later I used a Henri-Jouvelet apparatus, which acts as a simple pump, squeezing the rubber tube conveying the blood in such a way as to keep up a perpetual flow from one vein to another, allowing less chance of clotting. The apparatus proved excellent for that purpose, especially when combined with Jubé trocars and cannulæ. It also conveniently records on a dial the quantity of blood transfused. The common practice of using a needle for transfusion suffers from the definite disadvantage that the needle may pierce the wall of the vein from inside. One is much safer with a trocar and cannula.

CADAVER BLOOD

At Teruel I first examined cadaver blood for use in transfusion. In all, I only examined 9 cases and they confirmed the work of Yudin and Skundina in the U.S.S.R. In those who died suddenly or within a few hours, no anticoagulant was needed to keep the blood liquid. Of the donors three died of suffocation and the others of severe wounds of the abdomen, head, and chest. In those who died of shock after surviving about six hours, the blood behaved in its clotting like blood from a living man. Twice I observed "fibrinolysis," spontaneous liquefaction of the clot, once 12 hours after collecting the blood, and once 36 hours after the collection (in each case the blood was taken within an hour of death). Unfortunately all factors were never simultaneously favourable to the use in transfusion of such blood.

Transfusion work in Catalonia was usually even more simple than on the centre front. Blood collected in Barcelona was placed in ampoules which, when sealed, contain 300 c.cm. of citrated blood, and about 200 c.cm. of compressed filtered air. The ampoule is connected by rubber tubing, first, via a filter, to a drip tube (and air-trap), and then to a sterile adaptor wrapped in waterproof paper. To give the transfusion it is only necessary to heat the ampoule, place a screw clip on the tube, and break the glass seal, whereupon the blood is driven out by the compressed air at a speed controlled by the screw clip. When the blood has reached the adaptor, this is connected to a needle that has been introduced into an antecubital vein of the patient.

TYPHOID

Once again I gave up this work in the winter of 1937, to direct what was to have been a surgical hospital on the Aragon front. An expected attack, however, did not come and soon we were in a typhoid epidemic. The hospital was in a wooden barracks; heating was practically impossible; suitable food, and even blankets for the patients, were short. The majority of cases had not been inoculated within six months, except for a number that had been inoculated after the initial fever of the disease. My impression of this inoculation was that it did more harm than good. The mortality approached 20 per cent. and sequelæ were many, the commonest being a very easily induced tachycardia. Death from the common complications, hæmorrhage and perforation, was observed. One case of perforation thought to be an acute appendicitis (he had not reported sick till he perforated) was diagnosed at operation and survived. Many died without recognisable complications. These developed, towards the end of the second week, increased diarrhœa with vomiting; they became rapidly dehydrated and died. Some with these symptoms survived with repeated and large intramuscular salines.

LABORATORY WORK

After the spring retreat of the Spanish eastern army back to the River Ebro, we had little transfusion work for some months, but we did organise in the small town in which we were stationed some 50 volunteer blood donors among the civil population. We accepted donors of all groups, reckoning that the proportion of donors in each group would correspond roughly to the proportion in patients. Our aim was to transfuse into each patient blood of his own group. Details of the donor were kept in a card index, and on that card (which had a white glazed surface) the actual grouping reaction was carried out, and dried on as a permanent record. Likewise, where possible, control agglutination tests were performed on the card with the serum of the patient before transfusion. During the next three months of comparative inactivity on this front, my assistant and I analysed some 2000 specimens of considerable diversity. We also investigated as blood donors most of the staff of the medical and surgical units with whom we worked in case blood transfusion from these people would be required; and we collected a store of grouping serum of good titre, investigating the titre of agglutination, after varying lengths of time, in the serum of various people. Slight hæmolysis seemed to cause an initial rise in titre followed by a rapid loss over a few weeks.

After two years in Spain the experience obtained has been considerable especially in blood transfusions, of which I have performed 239 personally. The laboratory, by now, must have received its 3000th specimen.

OBITUARY

THOMAS MONCK BURN-MURDOCH, M.B.Edin., F.R.C.P.E.

Dr. Burn-Murdoch, who died on Sept. 13th in his 84th year, was a distinguished Edinburgh practitioner before he left medicine twenty years ago to take over the responsibilities of a family estate. Born in Edinburgh, second son of John Burn-Murdoch, advocate, he was educated at Begbie's and the Edinburgh Collegiate schools. He studied medicine at Edinburgh University while Lister was still teaching there, and after graduating in 1877 he was house surgeon to P. H. Watson at the old Royal Infirmary, and served under him again later at Chalmers Hospital, where he had both medical and surgical experience. He then began to practise in the Morningside district of Edinburgh, moving later to Charlotte-square. In 1883 he became extra physician to the Royal Edinburgh Hospital for Sick Children, full physician in 1899, retiring in 1906; his long association with this hospital stimulated his interest in the health and physical welfare of children and led to his appointment for many years as physician to the Ministers' Daughters' College and as medical officer to Merchiston Castle School. In October, 1914, on the death of his elder brother, he inherited the family property of Gartincaber, at Doune, Perthshire, and decided with reluctance to give up his professional work; but the war intervening he went to Greenock with honorary rank of major R.A.M.C. to organise the Smithson War Hospital, took command later of the Springburn Woodside Central Hospital at Glasgow, and finally in 1918 became medical officer to Dalmeny House Hospital.

Spare of figure and athletic in build, Dr. Burn-Murdoch was brought up with the facilities for an outdoor life and remained physically fit to the end. It is related that on one occasion he repeated his father's feat of walking in the day from Edinburgh to Gartincaber—a distance of 47 miles. In his student days he won distinction as a three-quarter back at Rugby and many events as a sprinter. He is credited with the introduction into Scotland of the method of running between strings and himself pegged out the lines when they were first employed for the 100-yards race in the university sports. He was active in securing the athletic field at Craiglockhart.

In 1850 Dr. Burn-Murdock married his cousin, Anne R. de Maule Urmston, who predeceased him by a few months. He is succeeded as laird of Gartincaber by his son, Lieut.-Colonel Ian Burn-Murdoch.

HENRY WILLIAM COLLIER, M.D. Durh.

Dr. H. W. Collier, who died on Sept. 14th, spent his life in medical insurance practice, having been chief medical officer to the Economic Insurance Company and the National Mutual Life Association of Australasia as well as medical referee to the Norwich Union, the Sun, and other companies. Qualifying from Guy's Hospital in 1894, he was resident there and at the Miller Hospital before starting on independent practice, where he soon became a notable figure in the insurance world. With the triple armature of wide experience, sound judgment, and quick decision, his opinions on the merits of cases put before him for consideration were rarely at fault. President of the Assurance Medical Society in 1935–36, in succession to the late Theodore Thompson, his inaugural paper on Life Assurance without Examination aroused much interest. "It is almost impossible," writes one of his colleagues, "to believe that Collier is gone. His alertness, vivacity and youthfulness gave one the impression that age had passed him by." Dr. Collier leaves two sons, one of whom is specialising in medical insurance work.

KENNETH HAROLD WATKINS, M.S., B.Sc. Lond., F.R.C.S.

THE death of Mr. Kenneth Watkins at the age of 34 after a motor accident in Germany has robbed Manchester of one of its most brilliant younger surgeons. He took his medical training in the Manchester medical school, where he secured many scholarships and prizes, graduating with honours in both the London and the Manchester degree examinations in 1927. Later he added the highest surgical distinctions. Quite early on he became much interested in urology and when, in 1932, he was awarded a Rockefeller travelling scholarship, he elected to work under Prof. H. H. Young in the Brady Urological Institute at Johns Hopkins Hospital, Baltimore, and afterwards in Freiburg.

On his return to Manchester, Watkins decided to specialise in urology and he became honorary surgeon to the urological departments of the Manchester Northern and Christie Hospitals, urological assistant to the Manchester Royal Infirmary and consulting surgeon to the Crumpsall Hospital. He combined a brilliant intellect with the instincts and outlook of a physiologist. His numerous communications to learned societies and the medical journals showed him to be a keen and thorough investigator. It came as no surprise to his friends to find the quality of his work recognised by the Royal College of Surgeons of England in the form of a Hunterian professorship in 1933. He was a hard worker and had already carved for himself an important place in the surgical life of Manchester. That he should be robbed of his just reward is one of the sadder aspects of his tragic death. High as were his academic attainments, he will be remembered best for his sterling qualities. His loyalty, friendliness, and innate honesty were so apparent that he was regarded with affection by a large circle who will mourn the loss of a rare and lovable personality.

NUMA SYLLA BONARD, M.D. Geneva, M.R.C.S.

Dr. Bonard, who died on Sept. 18th in a nursing-home at Nice after a short illness, was Swiss by birth and education. After taking the Federal diploma in 1908 he spent several years as assistant in various Genevese surgical, medical pædiatric, and dermatological clinics. When war broke out he was free to volunteer as surgeon to auxiliary military hospitals in France, afterwards coming to London as resident medical officer at the French Hospital, from which he transferred to the London Lock Hospital. Here

he experimented with Salvarsan substitutes; a careful paper on Luargol ("102") at this time appeared in our columns. He was then invited by Sir William Girling Ball to assist him in the establishment in Golden-lane of a department for venereal diseases under the ægis of the City Corporation. At this centre Bonard was responsible for the treatment of cases of syphilis, and they remained his chief care when the department was transferred later to St. Bartholomew's Hospital. He was popular alike with patients, colleagues, and nursing staff. Seeing perhaps a hundred patients at a session, he was never ruffled by pressure of work. Of the people who will miss him the patients come first; no one could calm a distressed patient better than Bonard. "Where is the Great White Chief?" they would ask, "I should like to wait until he returns." Later on he worked as pathologist at special hospitals in London, the Hospital for Men in Dean-street, and the Hospital for Women and Children in Harrow-road. He was also medical officer to the Phœnix Insurance Company. Everywhere he left the same impression of untiring worker and good fellow.

DR. HERBERT JOHN ROPER, who died unexpectedly after a short illness while on holiday, qualified at Leeds in 1887 and was a surgical dresser at the Infirmary in pre-Listerian days. At the medical school he won both senior and junior anatomy medals and the Thorp prize in medicine, along with other distinctions. Medicine was his first and chief interest in life, and during the 47 years he was in practice he had the opportunity of doing a good deal of surgical work. In his spare moments he kept himself up to date by reading current medical publications, with the result that he was able to put into practice such of the newer methods of treatment as seemed to him worthy of trial. He died of cerebral hæmorrhage at the age of 74.

Colonel P. C. H. STRICKLAND, I.M.S., who died on Sept. 4th at Clifton, Bristol, was son of Major-General W. G. M. Strickland, and was born at Chindwara, Central Provinces, India. He was educated at Dulwich College and qualified M.R.C.S. from St. Bartholomew's Hospital. Entering the Indian Medical Service in 1887, he rendered service with the Mogoung Column and with the Wuntho Field Force, and became medical officer of the 33rd (afterwards 93rd) Burma Infantry. In 1914 he was A.D.M.S. of Sirhind and Jullundur Brigades, then of the Lahore Division Area, and from 1917 to 1919 was inspector-general of civil hospitals, Burma. Retiring in 1919, he went to live at Clifton. He is survived by his widow and two sons.

MR. SYDNEY A. SEWELL

IT must have been nearly 40 years ago that the initials S.A.S. first began to appear on drawings of pathological and clinical subjects. Mr. Sewell, who died on Sept. 4th, had migrated to London in 1896 after studying at the Norwich Art School, and soon became recognised for special skill in medical illustration. Several classical text-books and treatises owe much to his collaboration—among them Rose and Carless's Surgery and Gray's Anatomy—and he was responsible for many of the fine plates in the pathological atlas of the *British Journal of Surgery*. He used both brush and pencil and occasionally made line drawings. Sewell was keenly interested in his craft and would take endless pains to ensure accuracy without sacrificing artistic merit; his method was to make numerous sketches from dissections and preparations and work them up at leisure. He was at his best when unhurried, but in an operating theatre could pick up the various steps of any technique with unerring precision. In 1916 Mr. Sewell went to France and several of the paintings he did there are now in the war museum of the Royal College of Surgeons. It was in one of the rooms on the fifth floor of the College that he did much of his work, and winter and summer he was usually to be found there. During the last two or three years his health failed somewhat and his activities were curtailed, but his daughter, Miss Margaret I. Sewell, who had long helped him, was able to give satisfaction to many of his clients, and is continuing her work at his home in Harrow. Many surgeons, anatomists, and pathologists will regret the death of an obliging, imperturbable, and reliable collaborator.

PUBLIC HEALTH

A Model Health Clinic

A REMARKABLE feature of public health administration in recent years is the rapid development of health centres for the provision of various kinds of welfare services. As the facilities they offer become more widely known through the agency of health visitors and school nurses the centres grow in public estimation, and the calls upon them have naturally been intensified by the health campaign that began a year ago. Having defined the scope of its activities the municipality has to secure the best return for the expenditure of public money, time, and energy, and especially how most economically to provide a sufficient number of centres and an adequate range of services. The plan adopted in several areas, Bristol for example, is to establish peripheral clinics where certain essential services—infant welfare and antenatal services, dental treatment for the school-child and for the mother and infant, school medical inspection, and minor ailment treatment—are provided, working in coördination with a more fully equipped central health clinic to which cases can be referred from the outlying centres. The planning of the central clinic is important, and special interest attaches to an eight-page pamphlet just published by H.M. Stationery Office describing, with plans and photographs, the Model Health Clinic shown in the United Kingdom Government pavilion of the Glasgow Empire Exhibition. Designed by the Ministry of Health, with the assistance of the Board of Education, the Department of Health for Scotland, and a number of English and Scottish medical officers of health, it is intended to demonstrate "how remedial clinics and a positive health service can be combined in one large building to form a comprehensive health centre, which if suitably planned can serve other social and educational purposes as well." The services for which provision is made comprisé (1) the care of the expectant and nursing mother and children up to five years of age; (2) a clinic service for school-children; and (3) provision for tuberculosis and orthopædics. The model shows an attractive building, mainly of two storeys, provision being made for extensions over the one-storey parts, with caretaker's quarters in a third storey. An important feature is a large central hall, with kitchen attached from which tea can be served, intended for health education and various social functions such as lectures, film displays, cookery, sewing, and keep-fit classes. In an adjoining room demonstrations of cooking, &c., can be given. To prevent activities such as these from being disturbed by a flow of patients adequate waiting room is provided. The pamphlet illustrates how diversified are the welfare centres now provided by public health authorities.

OPENING OF THE MEDICAL SCHOOLS

IN connexion with the opening of the session at the London medical schools the following arrangements have been made:—

Charing Cross Hospital

Lord Stamp will distribute the prizes to the students on Friday, Sept. 30th, in the council room of the hospital at 4 P.M. A post-graduate course for former students of this hospital will be held on Oct. 1st and 2nd, and the annual dinner will take place on Saturday, Oct. 1st, at the Trocadero Restaurant at 8 P.M., with the Rev. A. W. Oxford, M.D., in the chair.

Guy's Hospital

On Oct. 7th at 3 P.M. Sir Henry Dale, F.R.S., will give an address on the Future of Medicine and will distribute the prizes. Viscount Nuffield will be in the chair.

King's College Hospital

Mr. E. Rock Carling will give the first lecture of the session at 4.30 P.M. on Tuesday, Oct. 4th. His subject will be What Do We Mean by "Cancer"? On Saturday, Oct. 15th, and Sunday, Oct. 16th, there will be lectures and demonstrations open to all practitioners. The dinner of past and present students will be held on Oct. 15th at the May Fair Hotel at 8 P.M., when Major-General Sir Cuthbert Sprawson will preside.

London Hospital

A post-graduate course for former students of the hospital will be held from Oct. 12th to 15th. The old students' dinner will take place on Oct. 13th at 8 P.M., at the Trocadero Restaurant, with Sir Henry Bashford in the chair.

Middlesex Hospital

A post-graduate course for former students of the hospital will be held from Sept. 30th to Oct. 2nd. On Sept. 30th the annual dinner will be held at the Savoy Hotel at 7.30 P.M., and Dr. G. E. S. Ward will be in the chair.

Royal Free Hospital

On Tuesday, Oct. 4th, at 3 P.M., Lord Horder will deliver the inaugural address at this hospital. He will speak on women as doctors. The annual dinner will be held on Dec. 1st, with Mr. Ulysses Williams in the chair. There will be a week-end post-graduate course for former students of the hospital from Dec. 2nd to 4th.

St. Bartholomew's Hospital

The new session opens on Oct. 3rd without formality.

St. George's Hospital

On Friday, Sept. 30th, at 3 P.M., Mr. Harold Barwell will deliver an inaugural address. His subject will be Some Years at St. George's. A short course for former students of the hospital will be held from Sept. 29th to Oct. 1st. The annual dinner will take place at the May Fair Hotel on Saturday, Oct. 1st, at 8 P.M. Dr. J. A. Torrens will take the chair.

St. Mary's Hospital

A post-graduate course will be held from Sept. 29th to Oct. 2nd, open to all medical practitioners without fee. The annual dinner of past and present students will take place at Claridge's Hotel on Oct. 1st at 7.30 P.M., with Dr. Walter Broadbent in the chair.

St. Thomas's Hospital

Prof. H. R. Dean will preside at the old students' dinner which will take place on Friday, Oct. 7th, at 7.45 P.M., at Grosvenor House.

University College Hospital

On Tuesday, Oct. 4th, a reception will be held in the library of the medical school, and at 3.15 P.M. Sir StClair Thomson will give an address on Lister at University College and Hospital (1844–52). The annual demonstrations for old students will take place on Oct. 6th and 7th. The annual dinner will be held in the library of the medical school on Friday, Oct. 7th, at 7.30 P.M., with Dr. F. Clayton in the chair. The annual dinner of the Women's Association will be held at the Langham Hotel at 8 P.M. on the same evening, and Miss Gwendoline Smith will preside.

Westminster Hospital

On Monday, Oct. 3rd, the winter session will open at the medical school, Horseferry-road, at 3 P.M., when Dr. Robert Hutchison, P.R.C.P., will deliver the inaugural address. He will speak on The Medical Race. The annual dinner of past and present students will take place at the Royal Palace Hotel, Kensington, W., on Saturday, Oct. 1st, when Dr. Adolphe Abrahams will be in the chair.

West London Hospital

The session begins on Oct. 15th at this hospital. No function is being held this year in connexion with the opening.

Royal Dental Hospital

Mr. H. L. Eason will preside over the prize distribution and conversazione to be held at the hospital on Oct. 4th at 8 P.M. He will speak on dental education and practice. The clinical At Home will be held on Nov. 26th, and the dinner of past and present students on the same evening at the Trocadero Restaurant at 7.30 P.M., with Mr. F. C. Porter in the chair.

Further details of post-graduate courses will appear in due course in our Medical Diary.

MEDICAL NEWS

University of London

Three lectures on principles of parasite control will be given on Oct. 10th, 11th, and 13th, at 5.30 P.M., at the Royal Veterinary College, Camden Town, by Prof. T. W. M. Cameron, D.Sc., director of the institute of parasitology in McGill University, Montreal. Admission will be free, without ticket.

University of Birmingham

An at home will be held on Oct. 4th at 2.30 P.M. in connexion with the opening of the medical school for its first session at the Hospitals Centre in order to give past and present students an opportunity of seeing the new school. At 5 P.M. Mr. Raymond Priestley, D.Sc., the incoming vice-chancellor, will distribute the prizes and deliver a short address. The annual dinner will be held at the Grand Hotel at 8.15 on the same evening.

Post-graduate Lectures in Edinburgh

Eight post-graduate lectures open to all medical graduates will be delivered in Edinburgh this autumn under the auspices of the Honyman-Gillespie trust in the Royal Infirmary at 5 P.M. on Thursdays. The subject matter of the lectures has been coördinated with an intensive course in internal medicine to be held during the autumn term. The following are the names of the lecturers and the titles of their lectures: Dr. A. Rae Gilchrist, the rational use of digitalis and other cardiac drugs (Oct. 20th); Dr. W. Ritchie Russell, neurology—some modern problems (Oct. 27th); Dr. T. A. Ross, psychotherapy (Nov. 3rd); Prof. R. V. Christie, emphysema (Nov. 10th); Prof. J. W. McNee, hepatitis (Nov. 17th); Dr. J. D. S. Cameron, protein in the treatment of nephritis (Nov. 24th); Prof. D. M. Dunlop, the significance of glycosuria (Dec. 1st); and Prof. L. S. P. Davidson, the mechanism of megaloblastic blood formation (Dec. 8th).

British College of Obstetricians and Gynæcologists

On Friday, Oct. 28th, at 2.30 P.M. Mr. T. N. A. Jeffcoate will deliver the first William Blair-Bell lecture at the college house, 58, Queen Anne-street, W. The subject of the lecture is uterine inertia. All medical practitioners are invited to attend.

Aberdeen University

The new Aberdeen medical school, of which a sketch appeared in the Students Guide, is to be opened on Sept. 28th by Lord Dawson of Penn.

Royal Sanitary Institute

Mr. H. T. Calvert, D.Sc., chemical inspector of the Ministry of Health, will open a discussion on the present trend of sewage purification at a meeting to be held at the institute, 90, Buckingham Palace-road, London, S.W., on Tuesday, Oct. 11th, at 5.30 P.M.

British Empire Society

At a joint meeting of the planters' and Empire social services' groups of this society on Thursday, Oct. 6th, at 8 P.M., Sir Malcolm Watson will speak on malaria and empire development. The meeting will be held at the house of the society, 18, Northumberland-avenue, London, W.C.

The Birth-rate

In the first half of 1938 there were registered, as the Registrar-General's returns show, 319,526 live births, 155,269 of which were recorded in the first quarter, and 164,257 in the second quarter. Combined this is the largest number registered for this period of the year since 1931, and amounts to a little over 10,000 more than the number recorded in the first half of last year. On an annual basis the live birth-rate per 1000 was 15·3 in the first quarter of 1938 and 16·1 in the second quarter. The former is the highest rate since 1931 and the latter the highest since 1932.

Epsom College

A Christie pension of £89 per annum will be filled by the Epsom College conjoint committee on Nov. 16th, and a France pension of £30 per annum will also be awarded shortly. Candidates must be duly qualified medical men of not less than 55 years of age, whose income, independently of any allowance from the Royal Medical Benevolent Fund, does not exceed £100 a year, if single, and £150 if married. One or more St. Anne's scholars will be elected by the council. Candidates must be fully 9 years of age, and must be orphan daughters of medical men who have been in independent practice in England or Wales for not less than five years. The value of the scholarship is dependent upon the means of the applicant and the locality and fees of the school selected. Forms of application, which may be had from the secretary of the college, 49, Bedford-square, London, W.C.1, should be completed and returned by Oct. 25th.

New Mental Treatment Centre at Middlesbrough

The need for increased accommodation for the treatment of early mental cases has been met at Middlesbrough by reconstructing the isolation block at St. Luke's Hospital. The alterations, which were begun in May last year, have now been completed at a cost of some £9000, and the new centre, which will be known as Berwick House, was formally opened by Sir Hubert Bond, the senior commissioner of the Board of Control, on Sept. 14th. The building consists of two wings, one for acute and one for quiet cases, divided into male and female sections. Each section of the acute wing has four single rooms and a day-room, all opening on a veranda, and one protectional room, and on the male side there is a dental treatment room with the necessary equipment. This wing is connected with the quiet wing by a corridor on which open rooms for medical examinations and electrical treatment, stores, the kitchenette and so on. The two parts of the quiet wing each contain a dormitory for four patients and a well-lighted day-room with a veranda, and this wing also includes bedrooms, dining and sitting rooms for the staff. Both wings have their own gardens and the decorations throughout have been designed to introduce as much brightness and cheerfulness as possible.

Medical Diary

Sept. 26th to Oct. 2nd

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

CHARING CROSS HOSPITAL, W.C.

SATURDAY.—10 A.M., Dr. N. S. Plummer: Recent Advances in the Treatment of Chest Diseases. 11 A.M., Dr. A. A. W. Petrie: Modern Shock Therapy in Mental Disturbances. Noon, Dr. R. A. Hickling: demonstration of clinical cases. 2 P.M., Mr. Eric Crook: Minor Surgery of Rectum and Anal Canal. 3 P.M., Mr. L. R. Broster: Abdominal Emergencies. 4 P.M., Dr. Gordon Holmes, F.R.S.: clinical demonstration.

SUNDAY.—10 A.M., Mr. W. D. Southern: The Clinical Aspect of Pyorrhœa. 11 A.M., Dr. K. Shirley Smith: Arterial Disease of the Limbs. Noon, Mr. Norman Lake: The Nature and Significance of Abdominal Pain. 2 P.M., Mr. H. G. E. Arthure: Antenatal Care. 3 P.M., Dr. S. Cochrane Shanks: The Radiological Investigation of the Appendix and Colon. 4 P.M., Dr. T. Fane Tierney: Contrast Media in Examination of the Accessory Nasal Sinuses.

Open only to former students of the hospital.

MIDDLESEX HOSPITAL, W.

FRIDAY.—2.30 P.M., Dr. H. Graham-Hodgson: Radiology of Accessory Nasal Sinuses. 3.30 P.M., Dr. T. Izod Bennett: The New Forms of Insulin.

SATURDAY.—10.15 A.M., Mr. J. P. Monkhouse: Diagnosis and Treatment of Nasal Sinusitis. 11.15 A.M., Mr. W. R. Winterton: Female Sex Hormones. 12.15 P.M., Dr. L. E. H. Whitby: Chemotherapy in Theory and Practice. 2.15 P.M., Mr. A. S. Blundell Bankart: Fracture clinic and demonstrations.

SUNDAY.—10.15 A.M., Mr. W. Turner Warwick: Treatment of Some Common Rectal Diseases. 11.15 A.M., Dr. C. E. Lakin: Nec Silet Mors. 12.15 P.M., Mr. E. Pearce Gould: Simple Affections of the Breast. 2.30 P.M., Mr. E. W. Riches: Modern Trends in Urology. 3.30 P.M., Dr. H. L. Marriott: Practical Points in Treatment.

Open only to former students of the hospital.

ST. GEORGE'S HOSPITAL, S.W.

THURSDAY.—1 P.M., Mr. G. A. Ewart: operations. Dr. J. N. Cave: anæsthetics. 1.45 P.M., Dr. E. Bellingham-Smith: Uræmias that Recover. 2.30 P.M., Mr. C. H. S. Frankau: fracture demonstration. 3.15 P.M., Mr. M. F. Nicholls: Resection for Enlarged Prostate. 3.15 P.M., Dr. C. P. Pinckney: demonstration of children's diseases. 4.30 P.M., Dr. A. Feiling: neurological demonstration.

FRIDAY.—9.30 A.M., Dr. J. F. Taylor: demonstration of pathological specimens. 10.15 A.M., Mr. B. H. Burns: orthopædic demonstration. 11 A.M., Mr. H. G. Taylor: Investigation and Treatment of Sterility. 11.45 A.M., Dr. H. Gainsborough and Dr. G. R. M. Cordiner: Organic Dyspepsias. 1.30 P.M., Mr. G. R. E. Colquhoun: operations. Dr. E. Landau: anæsthetics. 2 P.M., Dr. D. Freshwater and Dr. H. Gordon: skin cases. 3 P.M., Mr. Harold Barwell: Some Years at St. George's (inaugural address). 4.30 P.M., Dr. C. B. Levick: The Value of Electrocardiography in Diagnosis, Prognosis and Treatment.

SATURDAY.—9.30 A.M., Mr. R. Marnham: Use of Proctocaine in the Treatment of Certain Rectal Conditions. 10.15 A.M., Mr. L. Colledge and Mr. P. J. Jory: ear, nose, and throat demonstration. 10.15 A.M., Mr. J. H. Doggart and Mr. G. J. O. Bridgeman: ophthalmic demonstration. 11 A.M., Dr. D. Curran: Suicide. 11.45 A.M., Dr. Robinson Thomas: New Methods in Radiological Diagnosis.

Open only to former students of the hospital.

ST. MARY'S HOSPITAL, W.

THURSDAY.—11 A.M., Dr. W. D. W. Brooks: Chronic Bronchitis and Emphysema. Noon, Prof. Frederick Langmead: Some Everyday Disorders of Children. 2.15 P.M., Mr. V. Zachary Cope: The Neglected Thyroid. 3.15 P.M., Dr. Denis Brinton: Neurological Emergencies.

FRIDAY.—10.15 A.M., Mr. Douglas MacLeod: Some Common Gynæcological Disorders and their Treatment. 11 A.M., Prof. C. A. Pannett: Carcinoma of the Rectum. Noon, Dr. T. A. Ross: Psychotherapy. 2.15 P.M., Dr. T. C. Hunt: The New Insulins and Other Recent Advances in Treatment. 3.15 P.M., Mr. Leslie Williams: Puerperal Sepsis.

SATURDAY.—10.15 A.M., Mr. A. E. Porritt: New Treatments for Old Injuries. 11 A.M., Dr. Reginald Miller: The "Medical" Appendix. Noon, Mr. Aleck Bourne: The Objects of Postnatal Examination and Care. 2.15 P.M., Dr. A. Hope Gosse: Pulmonary Problems. 3.15 P.M., Mr. C. W. G. Bryan: Some Debatable Aspects of Appendicitis.

SUNDAY.—10.15 A.M., Mr. R. M. Handfield-Jones: Acute Retention of Urine—New Views for Old. 11 A.M., Prof. Henry Cohen: The Diagnosis of Intracranial Tumours. Noon, Mr. A. Dickson Wright: The Value of X Ray in the Diagnosis of the Acute Abdomen.

Open to all practitioners without fee.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY to SUNDAY.—WEST END HOSPITAL FOR NERVOUS DISEASES, Welbeck-street, W., M.R.C.P. afternoon course in neurology.—PHYSIOLOGY LECTURES FOR PRIMARY F.R.C.S., Mon., Wed., and Fri., at 5.30 P.M.—BROMPTON HOSPITAL, S.W., Tues. and Fri., 5.15 P.M. M.R.C.P. course in chest diseases.—ROYAL CHEST HOSPITAL, City-road, E.C., Mon., Wed., and Fri., 8 P.M., course in chest and heart disease (open to non-members).—GORDON HOSPITAL, Vauxhall Bridge-road, S.W., all-day course in proctology.—PARK HOSPITAL, Hither Green, S.E., Sat. and Sun., course

in fevers.—PRESTON HALL, nr. Maidstone, Kent, Sat., all-day demonstration on pulmonary tuberculosis.

MANCHESTER ROYAL INFIRMARY.
FRIDAY.—4.15 P.M., Prof. F. E. Tylecote: medical cases.

UNIVERSITY OF GLASGOW.
TUESDAY.—4.30 P.M. (Tennent Memorial Building, Church-street), Dr. John Marshall: Keratitis.

Appointments

BLACK, T. E., L.D.S., Assistant School Dentist for Brighton.
*CLARKE, ROY, M.R.C.P., Resident Physician, Dudley-road Hospital, Birmingham.
CUTHBERT, T. M., M.R.C.S., D.P.M., Deputy Medical Superintendent at Cherry Knowle (Sunderland County Borough Mental Hospital).
DAVIES, G. T., M.D. Lond., D.P.H., Medical Superintendent at Kelling Sanatorium, Holt, Norfolk.
ELDER, A. T., M.D. Glasg., B.H. Durh., D.P.H., Assistant Medical Officer of Health for Lancashire.
KEANE, P. J., L.D.S., Assistant School Dentist for Brighton.
MCLAREN, H. C., M.B. Glasg., Gynæcological Registrar at Royal Infirmary, Aberdeen.
POWELL, E. C., M.R.C.S., Assistant Medical Officer for Rhondda Urban District Council.
RYCROFT, B. W., M.D. St.And., F.R.C.S., Surgeon to the Royal Eye Hospital, Southwark, and Dean of the Medical School.
SPICER, E. R., M.B. St.And., Resident Medical Officer at St. Mary's Infirmary, Leeds.

* This appointment was given incorrectly in our issue of Sept. 17th.

Vacancies

For further information refer to the advertisement columns

Ashton-under-Lyne, Lake Hosp.—Res. Obstet. Officer, £350.
Bedford County Hosp.—First H.S., £155.
Belgrave Hosp. for Children, 1, Clapham-road, S.W.—Two H.P.'s and H.S., each at rate of £100.
Birmingham and Midland Eye Hosp.—H.S., at rate of £130.
Birmingham City Mental Hosp.—Jun. Asst. M.O., £350. Also Deputy Med. Supt., £625.
Bradford Royal Infirmary.—Two H.P.'s and Five H.S.'s, each at rate of £150.
British Postgraduate Medical School, Ducane-road, W.—Asst. in Morbid Anatomy in Dept. of Pathology, £300.
British Red Cross Society Clinic for Rheumatism, Marylebone-road, W.—Hon. Dermatologist. Also Hon. Neurologist.
Bury St. Edmunds, West Suffolk General Hosp.—H.S. and H.P., at rate of £180 and £150 respectively.
Cambridge, Addenbrooke's Hosp.—H.P., and H.S. to Spec. Depts., each at rate of £130.
Central London Throat, Nose, and Ear Hosp., Gray's Inn-road, W.C.—Third Res. H.S., at rate of £75.
Chester Royal Infirmary.—H.P. and H.S., each £150.
Colchester, Severalls Mental Hosp.—Two Jun. Asst. M.O.'s, each £510.
Deal, Victoria Hosp.—Res. M.O., at rate of £150.
Dorchester, Dorset County Hosp.—H.S., at rate of £150.
Dreadnought Hosp., Greenwich, S.E.—Med. Supt., £250. Also H.S., at rate of £110.
Durham County Council.—Two Asst. School M.O.'s, each £500
Greenwich Metropolitan Borough.—Jun. Asst. Maternity and Child Welfare Officer, £500.
Guildford, Royal Surrey County Hosp.—Hon. Asst. Radiologist. Also Hon. Phys. in charge of Physio-therapy Dept.
Halifax General Hosp.—Two Jun. Res. M.O.'s, each £250.
Hosp. for Consumption and Diseases of the Chest, Brompton, S.W.—Res. Surg. O., £150; Asst. Res. M.O., at rate of £150. Also three H.P.'s, and H.P. for Frimley Sanatorium, each at rate of £50.
Hosp. of St. John and St. Elizabeth, Grove End-road, N.W.—Res. H.S., at rate of £75.
Hull, Anlaby-road Institution.—Asst. M.O., £350.
Hull Municipal Maternity Home and Infants' Hosp.—Jun. R.M.O., at rate of £100
Ilford, King George Hosp.—Hon. Surgeon. Also Asst. Cas. O. and H.S., and H.S., each at rate of £100.
Indian Medical Service.—European Officers.
Iraq Government.—Ear, Nose, and Throat Specialist, 150 Dinars per mensem.
King Edward Memorial Hosp., Ealing.—Consulting Phys. for Dis. of Children.
Leeds Public Dispensary and Hosp.—Ophth. and Aural H.S., and Three H.P.'s, each at rate of £150.
Leeds University Dept. of Physiology.—Part-time Lecturer, £400.
Liverpool, Mill-road Infirmary.—Deputy Med. Supt., &c., £450.
Liverpool City.—Res. Asst. M.O.'s, each £250.
Liverpool Heart Hosp.—Hon. Asst. Physician.
London Chest Hosp., Victoria Park, E.—H.P., at rate of £100. Also Asst. Surgeon.
London County Council.—Asst. M.O.'s, Grade I, £350. Also Grade II, £250.
Maidstone, Kent County Mental Hosp.—Asst. M.O., £509.
Manchester, Ancoats Hosp.—Radiological Officer, £400. Also Surg. Reg., £50.
Manchester, Monsall Hosp. for Infectious Diseases.—Second Res. Asst. M.O., £350.
Manchester, Northern Hosp.—Res. Surg. O., at rate of £200.
Manchester, Victoria Memorial Jewish Hosp., Cheetham.—Hon. Asst. P.
Metropolitan Hosp., E.—Surg. Reg.
Middlesex County Council.—Res. Asst. M.O.'s, £400.
National Hosp., Queen-square, W.C.—Asst. Reg., £200. Also Res. M.O., £150.
National Hosp. for Diseases of the Heart, Westmoreland-street, W. Res. M.O. and Out-patient M.O., at rate of £150 and £125 respectively.
National Temperance Hosp., Hampstead-road, N.W.—Res. M.O. and Cas. O., at rate of £175 and £120 respectively. Also H.S., £100.
Newcastle-upon-Tyne, King's College.—Demonstrator in Bacteriology, £300.
Newport, Mon., Royal Gwent Hosp.—Cas. O., at rate of £150.
Northamptonshire County Council.—Temp. Asst. County M.O., £500.
Norwich, Norfolk and Norwich Hosp.—H.S., £120.
Nottingham, Harlow Wood Orthopædic Hosp.—Two H.S.'s, each at rate of £200.
Nottingham City Hosp.—Asst. M.O., £350.
Paddington Green Children's Hosp., W.—H.P. and H.S., each at rate of £150.
Penshurst, Cassel Hosp. for Functional Nervous Disorders, Swaylands.—Res. M.O., £400.
Preston, County Mental Hospital, Whittingham.—Dental Surgeon, £500.
Preston, Sharoe Green Hosp.—Jun. Asst. Res. M.O., at rate of £100.
Princess Beatrice Hosp., Earl's Court, S.W.—Res. Surg. O., at rate of £200.
Princess Louise Kensington Hosp. for Children, N. Kensington, W.—Hon. Asst. Physician.
Queen Mary's Hosp. for the East End, E.—Hon. Surgeon.
Queen's Hosp. for Children, Hackney-road, E.—Ear, Nose, and Throat Surgeon.
Redhill, Surrey, Royal Earlswood Institution.—Jun. Asst. M.O., at rate of £250.
Romford, Oldchurch County Hosp.—Two Jun. Res. M.O.'s, each £250.
Royal Army Medical Corps.—Commissions.
Royal Naval Medical Service.—Vacancies.
St. Albans and Mid-Herts. Hosp.—Res. M.O., £150.
St. Albans County Institution, Oster House.—H.S., £175.
St. Mark's Hosp. for Cancer, &c., City-road, E.C.—Clin. Asst. in Out-patients' Dept.
St. Mary's Hosp. for Women and Children, Plaistow, E.—Hon. Anæsthetists.
Salford Royal Hosp.—Hon. Radiologist.
Sheffield Children's Hosp.—H.S., at rate of £100.
Somerset County.—M.O.H. for Urban Districts, £800.
Tilbury Hosp., Essex.—H.S., at rate of £140.
Wellington, New Zealand, Dept. of Health.—School M.O.'s, £515.
Wellington Hosp., New Zealand.—Med. Reg. and Surg. Reg., each £500.
West London Hosp., Hammersmith, W.—Hon. Physician to Psychological Medicine. Also Hon. Reg. to Ear, Nose, and Throat Dept.
West Riding of Yorkshire County Council.—Asst. Tuberculosis O. and Asst. Bacteriologist, each £500.
Winchester, Royal Hampshire County Hosp.—H.S., at rate of £100.
Worcester Royal Infirmary.—Sen. H.S., £150.
York County Hosp.—H.S., £150.

The Chief Inspector of Factories announces vacancies for Examining Factory Surgeons at Pangbourne (Berkshire), Rainham (Essex), and Neilston (Renfrew).

Births, Marriages, and Deaths

BIRTHS

BEDFORD.—On Sept. 18th, the wife of Dr. Evan Bedford, Queen Anne-street, W.—a son.
SHARP.—On Sept. 12th, at Belsize-grove, N.W., the wife of Dr. B. Buckley Sharp—a son.
WARD.—On Sept. 14th, 1938, at "Eaglehurst," Bridlington, to Marjorie (née Kershaw), wife of Dr. Gerald L. Ward—a son.

MARRIAGES

KININMONTH—KINSEY-MORGAN.—On Sept. 15th, at the Church of St. John the Evangelist, Edinburgh, Dr. John Gordon Kininmonth, to Beatrice Margaret Kinsey-Morgan.
LUDLAM—KEMP SMITH.—On Sept. 14th, at the Parish Church Dalmeny, Dr. Martin Ludlam, to Janet Kemp Smith.

DEATHS

BARR.—On Sept. 14th, at Troon, John Stoddart Barr, M.B. Glasg., F.R.A.C.S., late of Hobart, Tasmania.
BONARD.—On Sept. 18th, at Nice, Numa Sylla Bonard, M.D. Geneva, M.R.C.S., of Harley-street, W.
BURN-MURDOCH.—On Sept. 13th, at Doune, Perthshire, Thomas Monck Burn-Murdoch, M.B. Edin., F.R.C.P.E., aged 83.
CLEVELAND.—On Sept. 17th, at Lee-road, Blackheath, S.E., Col. Henry Francis Cleveland, C.I.E., M.R.C.S., I.M.S. (retd.).
FRANCIS.—On Sept. 16th, at Valparaiso, Chile, William Henry Francis, M.B. Edin., M.R.C.S., late of Coquimbo, Chile, aged 77.
PITKIN.—On Sept. 14th, Montague Claude Melville Pitkin, M.R.C.S., formerly of Earleywood School, Ascot.
ROPER.—Herbert John Roper, M.R.C.S., aged 74, of 4, Spence-place, Leeds, Yorks, quite suddenly at Polzeath, Cornwall.
WATKINS.—On Sept. 15th, in Germany, after a motor accident, Kenneth Harold Watkins, M.S., F.R.C.S., husband of Irmgard Watkins, of Stonelegh, Platt-lane, Manchester, and son of Dr. and Mrs. Harold Watkins of Newton-le-Willows. Interred at Newton Cemetery, Wednesday, Sept. 21st.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

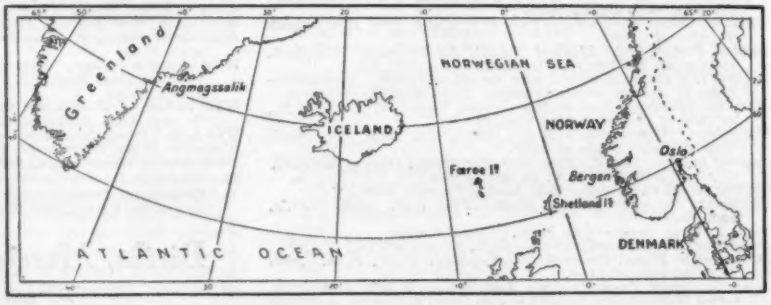
TUBERCULOSIS IN ESKIMOS

By Arne Høygaard

FROM THE INSTITUTE OF PHYSIOLOGY, UNIVERSITY OF OSLO

During the winter of 1936–37 in Angmagssalik, East Greenland, I made an investigation into the problem of tuberculosis in Eskimos. Angmagssalik and its inhabitants were unknown to white men until 1884 when it was explored by the Dane, Gustav Holm. He saw two cases which were "very like tuberculosis." In 1894 a trading station was established and the first missionary (Pastor Rüttel) saw several cases of hæmoptysis (Meldorf 1904). In 1898 the place was visited by the Danish physician Poulsen, who saw many cases of hæmoptysis which did not seem to affect the general good condition of the patients (Poulsen 1909). He was not sure whether the condition was tuberculous.

On the west coast of Greenland and especially on the northern part of the coast, where people live by hunting seal, it is well known that tuberculosis has quite a different clinical course from that in Europe. Large numbers have hæmoptysis, but the disease does not affect the general condition very much and Koch's bacillus is difficult to find in the sputum. Two Frenchmen, Mehaute and Tcherniakofsky, in 1934 made an investigation in Scoresby Sound where 120 Eskimos lived, who in 1925 had moved from Angmagssalik. They found that many had hæmoptysis, and X ray examination revealed "ganglio-hilar" changes with and without invasion of the parenchyma. The investigators did not succeed in finding tubercle bacilli (in about 20 cases), but they found some filaments and thought that the disease might be caused by actinomyces. I do not pay very much attention to this work because the numbers were too small and there are a lot of other diseases which give Eskimos hæmoptysis (see later). Actinomycosis has furthermore quite a different prognosis and causes empyema and rapid destruction of the pulmonary tissues.



AUTHOR'S OBSERVATIONS

In Angmagssalik 806 Eskimos of unmixed blood were living; 106 of them in the neighbourhood of the trading station and the others in communities spread out along the coast. The people by the trading station lived in summer on the meat and organs of seals, in the autumn by cod-fishing, and in the winter mainly on cereals, sugar, margarine, and tea. In the summer of 1936 there were few seals and they had therefore to live for a long time on imported food. In the remoter districts people lived all the year round mainly by hunting sea-mammals, and in the "hunger time" (from March to May) they ate large quantities of sea algæ, very rich in ascorbic acid (10–50 mg. per 100 g. as determined by the method of Emmerie and van Eekelen 1934).

By clinical examination I found that 10 per cent. of the inhabitants of the trading station suffered from pulmonary tuberculosis and 1·5 per cent. of the folk in the outlying districts. During the winter of 1936–37 I observed in the trading station 17 new infections, and the disease had a very bad prognosis: 3 died of miliary tuberculosis, 1 of meningitis, and 2 of pulmonary tuberculosis, and 5 patients developed pleurisy. Tuberculous patients living in the trading station did not show the same tendency to hæmoptysis as those from the scattered districts.

In the coastal districts I found 19 patients with definite pulmonary tuberculosis and 9 doubtful cases with hæmoptysis and positive Pirquet tests but without physical signs. In 11 the hæmoptysis was not caused by pulmonary tuberculosis but by pneumonia, bronchitis, and heart disease. In one instance only was bleeding from the pharynx found. Tuberculosis in the country districts was very benign and though all cases had hæmoptysis their general condition was good. (The old way of treating hæmoptysis in Angmagssalik was to let the patient run up and down with snow on his chest until the bleeding stopped.) Hæmoptysis is more common in the winter than in the summer.

Four patients with undoubted pulmonary tuberculosis and five doubtful cases had a very characteristic history—hæmoptysis when young but not later. Seven of them were elderly women and two elderly men. The Pirquet reaction was positive in 20 per cent. of the entire population: in those over thirteen it was found positive in 40 per cent. of men and 23 per cent. of women, while in children only 9 per cent. gave a positive reaction.

The great difference between men and women depends on the fact that the men visit the trading place more often. In 12 children under three years old whose parents had pulmonary tuberculosis there were 7 Pirquet-negative. This depends on the well-known fact that in the phthisis of Eskimos the organism is seldom found in the sputum. On the other hand I saw 7 persons in one house infected almost at the same time.

In houses with proved cases of pulmonary tuberculosis 65 per cent. gave positive Pirquet tests, while in houses with doubtful cases only 24 per cent. were positive. In families free from tuberculosis only 5·6 per cent. reacted to the test. In the southern and most isolated part of the district 111 people live in four small communities. Among them I found no cases of tuberculosis and only 1 per cent. had positive Pirquet tests. But one cannot conclude from this that tuberculosis is a "new" disease brought to the Eskimo by white people. In such small and separated communities tuberculosis may possibly "die out." Practically speaking, it is only the pulmonary form of

tuberculosis which is infectious and only a small proportion of those infected will get pulmonary tuberculosis —say 1 per cent. In a little community with about 30–50 inhabitants there is a good chance that nobody in the next generation will get the disease at all, and the chain is broken.

One of the cases, a youth of 18 who lived in the trading station, showed signs of scurvy by Göthlin's (1931) test, and the ascorbic acid in his blood was 0·05 mg. per 100 c.cm., saturation being reached after 4·8 g. of ascorbic acid had been given by mouth. In tests taken in February I had found the lower values for ascorbic acid in the blood of those living at the trading station. With Edmund's test (Edmund and Clemmesen 1937) I found values indicating that vitamin deficiency is unusual. Epistaxis, however, is common among Eskimos, almost everybody at some time suffering from it, especially in the springtime. Rabinowitch (1936) found in Eskimos of the eastern arctic regions of Canada that the condition there was due to hyperhæmoglobinæmia. In the cases examined by me the values for hæmoglobin in the blood were normal. In one instance (that of the young man with scurvy) there was considerable epistaxis which disappeared after or because of the treatment with ascorbic acid. But as I made no further examinations I cannot conclude that epistaxis in Eskimos is the result of lack of vitamin C (or P).

Bleeding from the nose has perhaps the same cause as hæmoptysis in Eskimos. In many of the cases there was striking variance between the tendency to hæmoptysis and the lack of physical signs, a fact that can only be explained if the bleeding comes from the bronchi and is not caused by destruction of pulmonary tissue. In my opinion their respiratory tract is easily vulnerable and it is for this reason that hæmoptysis and epistaxis are common.

Knud Faber (1938) showed that in Denmark and Sweden the mortality from tuberculosis was greater during the war than before or after, and is of opinion that this was the result of lack of meat in the food. In my opinion pulmonary tuberculosis runs a much better course in Eskimos living on meat than in Eskimos living at the trading post; but I must add that the food there was deficient in vitamin C. From experience of the hygienic conditions and of the mentality of the Eskimos I am sure that there is only one effective measure against tuberculosis in Angmagssalik—namely, decentralisation of the population.

SUMMARY

Angmagssalik, on the eastern coast of Greenland, has a population of 806 Eskimos of unmixed blood. Of 106 living in or near the trading station 10 per cent. suffer from tuberculosis, whereas the corresponding figure for the outlying settlements along the coast is only 1·5 per cent. At the trading station the prognosis is bad, whereas in the outlying districts, where the diet is largely composed of meat, it is good.

Hæmoptysis is common but is not as serious a sign as it is elsewhere: the Eskimo appears to have an unusually vulnerable respiratory tract and this may account for the frequency of hæmoptysis as well as of epistaxis. Vitamin-C (or vitamin-P) deficiency appeared to be uncommon except in the trading centre.

In four small southern communities with a population of 111 no tuberculosis was found and only one reacted to the Pirquet test. It is probable that tuberculosis may die out naturally in isolated settlements.

To combat infection the population should be prevented from congregating round the trading centre.

REFERENCES

Edmund, C., and Clemmesen, S. (1937) *Nord. hyg. Tidskr.* **18**, 9.
Emmerie, A., and van Eekelen, M. (1934) *Biochem. J.* **28**, 1153.
Faber, K. (1938) Tuberkulose og Ernæring, Copenhagen.
Göthlin, G. F. (1931) *Skand. Arch. Physiol.* **61**, 225.
Mehaute, P. J., and Tcherniakofsky, P. (1934) *Pr. méd.* **24**.
Meldorf, G. (1904) *Medd. Grønland*, **1**, 26.
Poulsen, K. (1909) *Ibid*, **1**, 28.
Rabinowitch, M. (1936) *Canad. med. Ass. J.* **34**, 487.

SOME IMPRESSIONS OF HOPPING

Dr. J. S. COTMAN (Paddock Wood, Kent) tells us that a G.P.'s work in a "hopping" area during the season is largely a matter of muddling through: the invasion of pickers is so vast and of such short duration that arrangements for their accommodation must necessarily be sketchy. We are all used to it however, he says, and know what to expect, and everybody, from the harassed medical officer to the farmer, buckles down to it and somehow makes the sketchy arrangements work.

From a medical point of view perhaps the most striking fact is the very small amount of sickness amongst the pickers, though the majority come from the poorer districts of London and many are ill-nourished and of poor physique. For the duration of picking they live in wooden or corrugated iron huts and do their cooking over open fires. The children —and they come down in thousands—instead of playing in the streets roam the hop gardens and perhaps pick some hops in the daytime and play round the camp fires in the evenings. They fall into the ditches and the river, yet few come to much harm, and in seven years of "hopping" I only remember one serious burn—a baby who sat down on a still glowing fire. Scalds, on the other hand, are perhaps the commonest accident to come to the doctor, nearly always of the foot. I do them up in Elastoplast and they do wonderfully well. How one blesses elastic plaster bandages; was there ever a more universally applicable first-aid remedy? Nights are apt to be cold in September and often in an unsettled season all the pickers get soaked to the skin; yet there are few cases of pneumonia, though of course coughs and colds are common whatever the weather. Meat pies and sausages are consumed in enormous quantities, and gastro-enteritis is fairly common, but again a really severe case is a rarity. As might be expected, diphtheria and scarlet fever are our chief bogies.

The sanitary authorities make regulations to which the farmer must adhere for the pickers' accommodation. Huts must be 10 ft. by 9 ft. and must not sleep more than five adults, a child under 12 counting as half an adult; there must be so many latrines and so many kitchens. The farmers generally do their best to make their pickers comfortable, but recently they have had a run of lean years and many are not in a position to sink capital in anything so unproductive as a hut. For all that great improvements have been made even in my short experience, particularly in the provision of more latrines and roofed cookhouses and the replacement of old huts by new ones of an improved and larger type. These have a concrete floor, a window, and often a raised wooden platform on which the straw bed is placed. With a little wallpaper and furniture which they bring with them the pickers soon make their huts cosy and comfortable enough.

There is a steady improvement in the behaviour of the pickers. Farmers keep a list of their pickers

and send a post card for them at the beginning of the season; anyone who makes a nuisance of himself is struck off the list and is not asked the following year, at least to the same farm. A good deal of beer is drunk at the "local" on Saturday evening and Sundays, but in these days there is less and less of the excessive drinking of pre-war days, when a lady could not go out of doors from noon on Saturday to noon on Monday.

Various voluntary organisations have posts scattered among the camps for giving first aid to the pickers. These relieve the local G.P. of much trivial work and are remarkably efficient at sorting out the more serious cases for him to see. The Salvation Army and the British Red Cross both have posts in my area, and in addition we have the Crowhurst Farm Mission, started and run by Father Sargent, assisted by a voluntary staff of anything up to a dozen men, two or three of whom are final-year medical students. The mission has its own buildings and its own ambulance which is fitted up also as a dispensary, and takes about eight farms under its wing. The staff tour the camps in the evening, visit their patients, and dose them appropriately, referring their worries to me. What a wonderful experience of responsibility and the difficulties of practice for a student! One only hopes that the failure of the G.P. to make an exact diagnosis in every case of "pleurodynia" is not too big a disappointment to them.

One has many striking memories of hopping times: the unfailing cheerfulness and wit of the Cockney under the most trying conditions; the self-assurance of the ten-year-old bringing his baby brother up for treatment while mother gets on with the picking. I remember being called out on a cold, wet, and very dark night at the beginning of October to a large lorry overturned into a ditch containing 3 ft. of water. The lorry was carrying 32 pickers, with their bedding, bags, and bicycles, and miraculously no one was more than bruised, but sorting them out in the rain and the dark was a nightmare. The sight of a child of seven with measles and a temperature of 102° F. lying in a corrugated iron hut under a blazing sun is also not easily forgotten. The one thing we all hope for is sunshine: if we get a real hot spell it may increase the incidence of sore-throats and tummy troubles slightly, but it means that for the majority "hopping" is being a real open-air holiday with pay, which will help them enormously to withstand the coming London winter.

A TEACHER'S VIEW OF MENTAL DEFECT

A SERIES (the Changing World Library) intended for "people interested in everyday problems" has been enriched by the inclusion of a book by a teacher of mentally defective children.[1] Mr. Duncan gives an easy account of the general characteristics of defectives, child or adult, and of the legal and social aspects of the problem they present. It may be questioned whether the description in the Education Act of the types of children to be admitted to special schools can properly be regarded as a definition of the feeble-minded, but Mr. Duncan is not the first to fall into error in accepting it as such. He shows the absurdity of the present law by which a child may be certified mentally deficient and then "become normal by the magical process of attaining the age of sixteen years." The chapter on education is, of course, based on first-hand experience. The author quotes freely from the Wood report and differs from many of his professional colleagues in his sympathy with the idea permeating that report—that the dull and the defective constitute one educational problem. He expresses the view that the removal of the marriage ban on women civil servants and women teachers would be a contribution to national efficiency and racial welfare.

The sections discussing intelligence tests, the decline of national intelligence, and sterilisation should arouse interest. The book ends with a question—"Is it necessary, is it wise, is it kind, to go on permitting the unrestricted propagation of still more mental defectives?" Anything like an adequate or practical answer to a question so clumsily framed would be impossible and it is not astonishing that Mr. Duncan fails to supply one. He is on safer ground when he deals with such subjects as ascertainment and sets a good example to writers on mental deficiency by providing an illustration of three feeble-minded boys whose appearance is quite normal.

[1] Mental Deficiency. By J. Duncan, Headmaster, Hampshire County Council Special (M.D.) School. London: Watts and Co. 1938. Pp. 152. 2s. 6d.

THE COMBINATION OF MEDICAL LIBRARIES

THE relationship between the libraries of medical societies and of universities was one of the subjects discussed at the annual week-end conference of the university and research section of the Library Association held at Wills Hall, Bristol, from Sept. 16th to 19th, under the chairmanship of Mr. Arundell Esdaile. In Liverpool the university medical library provides for the needs of students, while the Medical Institution caters for qualified men. There is a mutual interchange of lists of acquisitions and an agreement between the librarians on the purchase of periodicals particularly important for medical readers. In the course of the discussion it emerged that this division is exceptional; in most provincial towns the medical libraries have been merged. Members of those medical societies which originally presented their collection of books to the university library, or make annual contributions towards its maintenance, are entitled to certain privileges in return. In Manchester the hospitals have combined in this arrangement and have given their books to the University Library. The Bristol Medico-Chirurgical Society, which has a fine tradition of members eminent in literature as well as medicine, has consented to hand over its books to the University library which has also received the libraries of the General Hospital and the Royal Infirmary. It is hoped, however, that medicine will soon have a separate block in the University in which the library will again become an independent unit. Prof. Parry, medical officer of health of Bristol, as a guest taking part in the discussion, added that for his staff of 35 full-time doctors and their lay assistants it had been necessary for him to form a library in the new Central Health Clinic, which contained also records of his department covering a period of more than seventy years. The view was expressed that though in London the libraries of the great medical societies contain a wealth of material, the lack of coördination between them and the medical schools results, on the whole, in a less well organised service than exists in the chief provincial centres. It was agreed that in all medical libraries the staff is called upon to supply references and other material to a greater extent than in the libraries of any other faculty.

OPHTHALMOLOGICAL SOCIETY OF UNITED KINGDOM. This society has instituted a Treacher Collins prize of £100 which will be awarded triennially for the best essay submitted upon a subject selected by the council. The subject for the first award is cerebro-spinal disease and its relation to the optic nerve. Essays should be sent before Dec. 31st to the hon. secretary of the society, 5, Racquet-court, Fleet-street, London, E.C.4, from whom further particulars may be had.

BOARD OF CONTROL (LUNACY AND MENTAL DEFICIENCY).—The address of the Board has been changed. In future all communications should be sent to Hobart House, Grosvenor-place, London, S.W.1.